A RICH CABINET, WITH Variety of Inventions:

Unlock'd and open'd, for the Recreation of Ingenious Sirpits at their vacant hours.

Being Receits and Conceits of severall Natures, and fit for those who are lovers of Natural and Artificial Conclusions.

AS ALSO

Variety of Recreative Fire-works, both for *Land*, *Air*, and *VVater*. And Fire-works of Service, for Sea and Shore.

Whereunto is added divers Experiments in *Drawing*, *Painting*, *Arithmetick*, *Geometry*, *Astronomy*, and other parts of the Mathematicks.

Collected by *J. W.* a lover of Artificial Conclusions.

The Third Edition, with many Additions.

LONDON,
Printed for *VVilliam Gilbertson* at the Sign of the Bible without New-gate in *Giltspur-street*.
1658.

S

C. 175. m. 28.

The Authour to his Book.

AS in a glaſſe herein you may behold
A goodly Caſcate ſet with pearls and
Not petty Gugau's to adorn the Breſt, (gold
The Neck, the Arm, but jewels of the beſt,
And choiceſt Learning, ſuch herein you'l find
Will pleaſe your fancy, & content your mind
Some for delight and recreation,
And ſome for ſerious contemplation;
Some in *Arithmetick*. that lofty Art,
Some likewiſe in *Geometry* are taught,
Some in *Aſtronomy* that Art moſt hie,
Others teach how to decorate the *Skie*,
With ſplendent *Stars*, ſilver & golden *Showers*
Which are th'effects of *Philoſophick* powers
Mind well therefore what's in this *Book*, & le
It hence be call'd *The Artiſts Cabinet*.

A RICH
CABINET
WITH
Variety of Inventions
in several Arts
and Sciences.
By I. W.
London
Printed for Will. Gilbertson
1658.

A RICH CABINET, WITH Variety of Inventions:

Unlock'd and open'd, for the Recreation of Ingenious Sirpits at their vacant hours.

Being Receits and Conceits of severall Natures, and fit for those who are lovers of Natural and Artificial Conclusions.

AS ALSO

Variety of Recreative Fire-works, both for *Land*, *Air*, and *Water*. And Fire-works of Service, for Sea and Shore.

Whereunto is added divers Experiments in *Drawing*, *Painting*, *Arithmetick*, *Geometry*, *Astronomy*, and other parts of the Mathematicks.

Collected by *J. W.* a lover of Artificial Conclusions.

The Third Edition, with many Additions.

LONDON,
Printed for *William Gilbertson* at the Sign of the Bible without New-gate in *Giltspur-street*.
1658.

BRITISH MUSEUM
30
74
MAR

TO ALL LOVERS of ingenious and Artificial Concluſions.

COurteous Reader, (you know, and I know, that) the Wits of this Age are accute and various, therefore how to pleaſe all mens fancies, is a Task too ponderous for my undertaking. I have here unlock'd and open'd to your view a rich Cabinet of varieties; If there be any thing therein contained that may yield you profit, ſolace of the mind, recreation of the ſpirits, or content, I ſhall think my labour well beſtowed, and be glad; If it be otherwiſe, I ſhall be ſorry that I have nothing therein to pleaſe your mind, intreating you to ſhut down the lid again, and then I hope there is no hurt done.

This may be compared to a Garden compoſed of ſundry varieties, wherein you may pick and cull out thoſe Flowers that beſt pleaſe you, and are fitteſt for your pleaſure or profit: For the laborious Bee gathereth

thereth her cordiall Honey, and the venomous Spi-
der her corroding poison (many times) from the
same Flower. And I know that there are some en-
vious Criticks that will snarl at me for publishing
many things contained herein; But I care the less
because I aim at the publick (and not my own pri-
vate) good; And no man (I think) should be
born onely to himself, and hide his Talent: And
therefore these few Receits which I have Collected
with divers of mine own (gentle Reader) I dedi-
cate freely to thy use; Knowing that Art imitating
Nature, glories alwayes in the variety of things
which she produceth, to satisfie the mindes of curi-
ous Inquisitours of Natural and Artificial Conclu-
sions. Therefore I doubt not but there are many
things contained in this small Volume, that will give
satisfaction to the Ingenious, for whose sakes I
have compiled it: So taking leave, I will ev-
er remain,

An Artists Friend,

JOHN WHITE

A Table for the ready finding of each ſeverall Receit in this Book.

Receit, How to make a glorious Light with a Candle, like the Sun-ſhine. page 1
How to cleave a thin Groat in ſunder like 2 groats. 2
How to hang a Pail of water upon a ſtick and nothing to ſupport it. 3
How to make dainty ſport with a Cat. 4
How to make very pretty ſport with Ducks or Poultry. 5
To have pretty ſport at Cock-fighting with a ſingle Cock. 6
To know the hour of the day by a Ring and a Glaſſe. 7
Another, to know the hour of the day & night at any time. 8
To have three Capons upon a Spit at one fire, and one ſhall be Raw, another boiled, and the other Roaſted. 9
To make two knives to hang upon a glaſs without falling. ib.
A ſpeedy way to make a Horſe fat, plump and luſty. 10
How to keep a Horſe from tyring, and to make him foam at the Bit. 11
To put ones finger, or to waſh in melted Lead. ibid.
A ready way to teach children their *ABC.* in maner of play. 12
An excellent way to teach one to read ſpeedily and truly. 13
Divers rare conceited motions performed by a Magnet or Load-ſtone. 14
The making of a Weather-glaſs, whereby to know the change of weather. 16
How to catch Kites, Ravens, Crows or the like alive. 19
A ready way to catch Pigeons, or other Fowl. ibid.
A merry Receit, ſhewing how to catch a Pick-pocket. 20
How to make birds or fowl drunk, that you may take them. 21
A way to take fiſh in a dark night, with a candle under water. 22
An excellent bait to catch fiſh with an Angle. 23
To make one Watch-candle outlaſt three watch-candles. 24

How

How to write a name upon a paper, and burn it, and yet afterwards it may plainly be read. 25
How to see plainly into a dark room at a great distance. ib.
How to view the back part of your head by glasses. 26
A trick to tell or name all the spots or Coat-cards yet never see them. ibid.
How to preserve and keep sweet all kind of flesh for a month together. 27
How to make a present drink for Travellers that cannot relish strange drink. 28
A good drink for Souldiers, Mariners, or poor people. ib.
A profitable way to harden leather, to last a long while. 29
To make a dainty Walking-Staff to have Knobs where you please. ibid.
A secret way to write Love Letters, or other, that cannot be discovered 30
How to know when the Moon is just at full by a glasse of water. 32
How to know the Moons age at her increase. ib.
How to know both the increase and decrease of the Moon. 33
How to fetch oyl or grease out of books, writings, papers or garments. ib.
How to refresh old Pictures, and make them look as if they were new. 34
To keep Swords, Halberts, edge-tools 7 years from rusting. 35
An excellent cement for broken glasses, China-dishes, &c. ib.
How to grave Arms, Posies, or Names upon an Egge 36
How to make wax either red or green. 37
A pretty way how to cast flowers in wax of divers colours. 39
How to make a bunch of grapes in wax, to seem natural 39
How to inlay colours in mettal, that will shew like Ammel. 40
How to inlay boxes, cabinets, or the like, with hard wax. 41
To harden the white of an Egge into Artificiall Gum for divers uses. 42
How to make a true South Sun-diall for a wall. ibid.
How to make a *Horizontal* or flat Diall, for a post. 45
How to make a Sun-diall upon the Cieling of a Room. 47
To make a Candle Dial, to know the time of the night. 48

How to keep Cherries, Pears, Nuts, &c. fresh all the year. 50
To make Grapes or other fruit to have no stones or kernels. 51
How to make yellow Roses grow, and make things green all the year. ibid.
How to colour Fruit, and to make them taste of Spices. 52
How to know which way the wind blows on the Cieling at all times. ibid.
How to keep drink quick & fresh that begins to be sower and dead. 53
An excellent way for baking of bread, without a hard cruft. 54
A dainty glistring Plaistring for Seelings, or for Wals. 55

Some few (but choice Physical Receits, &c.

OF the great verues of *Crocum Martis*, fit to be used at this present in the Army. 56
Of the rare vertue of the Quintessence of Honey and Wax, for many diseases. 57
Of the manifold operations of the Oyl of Cinamon. 59
How to distill and make Oyl of Rosemary flowers, with its vertues. ib.
How to help deafness, and to expell wind from the head. 59
How to help the tooth-ach without drawing. 60
A dainty Receit for curious Artists, or others for comforting the eyes. 61
Of Fractures or broken bones or joints displaced, with their cure: ib.
A precious Salve for all those that have had any member out of joint 63
How to order and dress a wound when it is first hurt. 64
An excellent Unguent, or Liniment for green Wounds. ib.
A soveraign Oyl or Balm for several Wounds. 65
An excellent Emplaister for all Wounds and Ulcers. ib.
Another excellent Plaister for Wounds in the breast or other parts. 66
Of the general signification of Sicknesses, either present or near hand. 67
Of the signification of the several colours of some Urines. ib.

A Table or Heads of the ſeveral ſorts of Fire-works both for Land and Sea Service, contained in thiſenſuing Treatiſe.

THe order and making in a true proportion of all ſorts of Moulds for Fire-works. 69
The makingof Roulers, Rammers and other things for Coſiſins. 71
How to order and make the Coffins of paper. 73
The order and manner how you ſhall choak a Rocket. 74
The manner of driving a Rocket, with the Inſtrument belonging thereto. 76
Of the compoſition and Receits for your Rockets. 77
The manner of heading a Rocket, and order of capping it. 80
The manner of finiſhing a Rocket. 81
The manner of firing Rockets with the deſcription of a ſtaff for the ſame. 83
Several compoſitions for ordring of ſtars of ſeveral colours. 85
The order and manner of making the beſt ſort of Stars. 86
The order and making of ſeveral fire works for the Rocket, as Serpents or Fiſgigs, Reports, Gold and Silver Rain, &c. 87
How to make your Fire-works run upon a Line backward and forward. 89
How to make a Wheel of Fire works to run forward and backward on the ground. 90
Another way for a ſingle wheel to be placed on a poſt, giving divers Reports 91
The order to make a fixed wheel, ſtanding upon a poſt giving divers Reports. 92
Another fixed wheel, which will caſt forth many Rockets into the ayr. 93
Another wheel which will caſt forth divers Serpents, and as many Reports. 94
Of night Combatants, with Faulchions, and Targets, Clubs, Maces, &c. 97
Another dainty one with Fiſgigs, called Jack in a Box. 98

Of

Of Pots of fire for the ground, which will make the air rebound with their Reports. 99
The making of a fire-Ball for the ground, which will be in continual motion. 100
The making a Ball for the water, vvhich vvill burn vvith great violence. 101
Another dainty water ball vvhich will ſhoot forth many Reports. 102
Hovv to make a Dragon, or the like, to run on the Line, ſpitting of fire. 103
The maner to repreſent S. *George* fighting with a Dragon. 105
Hovv to make a Whale or Mermaid, or other to play upon the vvater. 106
Of divers other rare vvorks vvhich are to be performed upon the vvater. 107
The compoſing of a ſhip of fire works with ſeveral motions. 110
Of Lances of fire for pleaſure and for Service. 111
Hovv to arm a Dart or Javlin vvith vvilde-fire, for the Sails or ſides of Ships. 115
Hovv to enter up a pair of ſtairs, or to defend ones ſelf being in a narrovv Room. 117
How to defend a breach, a Ship, or other place of defence. ib.
How to ſhoot *Arrows* of vvilde-fire out of a Croſs-bow. 119
Hovv to burn vvooden Bridges, Gates, Houſes, &c. 120
Hovv to cut the Cables, or the Shrouds of the Ships at a good diſtance. 121
Other devices for the cutting of Shrouds, or the like. 122
Another for the ſame buſineſſe. 123
Hovv to do excellent Service againſt an Enemy vvho vvould enter a breach, a gate, a bridge, a ſhip, &c. 123
Hovv to prevent a train of powder laid to blovv you up before you enter a Ship or other place. 124
Hovv to make Fiſgigs, by many called Serpents. 125
Hovv to make Runners on a Line. 126
Hovv to compoſe a vvheel. 130
Hovv to make a Club to caſt forth divers Fiſgigs. ibid.
The compoſition for this Club. 131
Hovv to make Rockets for the air. ib.

The

The Ingredients for Rockets for the air, of all sizes. 133
How to prime Rockets. ib.
Composition for blew and red ſtars. 134
A compoſition for Stars of a beautiful colour. ibid.
To make Golden Rain. ib.
To make a Jack in a box. 135
A compoſition that burns with a flame ſlow and ſure. ib.
Another ſort of mixture that burns ſparkling. ibid.
A compoſition for a white fire, that laſteth long. 136
How to compoſe a Caſtle of fire-works with ſmall charge. ib.
How to make Rockets for a Caſtle. 137
How to make Rockets for the ground. 138
An Almanack whereby to finde the daies of this preſent year 1653. ib.
An explanation of the ſaid Table. 139

Neceſſary directions for Drawing and Painting.

TO take the draught of any painted or Printed Picture ſeveral waies. 140.
Of waſhing Maps and printed Pictures. 143
To mak Allum water. 144
To make Gum water. ib.
To make Lime water. ib.
To make water of Soap aſhes. ib.
To make Size. ib.
How to prepare your colours. 145
How to mix & temper you Colours one with another, ſo that you may make what Colour you pleaſe. from 145 to 151

Experiments performed by Legerdemain.

TO make a pot freez b[illegible]e fire 151
How to make two Bells come into one hand, having put into each hand one. 152
How to make a Juggling Book. ibid.
Boxes to change grain. 153

A con-

A conceit to procure laughter. 154
To knit a hard knot upon a Handkercheif, and to undo the the ſame with words. 155
To transform one thing into another by folding of paper. 156
To convey money out of one hand into another. ibid.
To make a Sixpence ſeem to fall through a Table. 157
How to ſeem to blow a Sixpence out of another mans hand. ibid.
How to caſt money away, and to find it in another mans mouth. 158
How by the ſound of a Counter phillipped, to tell what ſide is uppermoſt, croſſe or pile. 159

Experiments in Arithmetick.

TO finde what number of men that are contained in a Square Battail. 160
To find what number of men are contained in a Battail whoſe Front and Flank are unequal. 161
To finde what number of men are contained in a Triangular Battail. 162
Of two Square Battails to one that ſhall contain the like number of men. 163
A number of men being to be embattelled to tell how many Ranks and how many Files they will make. 164
The height of the Wall of a Fort, and the breadth of the Trench being given to find the length of a Scaling-ladder. 165
The height of a Mountain being given, to know how far it may be ſeen at Sea. 166
To know the burthen of a Ship. 167
A pleaſant Queſtion concerning the diſcharging of Ordnance. ibid.
About the building of a Fort. 168

Pleaſant Queſtions in Arithmetick.

TO tell the number that any one ſhall think. 169
Of the Accuſation of a Thief. 170

Of

Of three Sisters. 170
Of one that bought and sold both at a Rate. 172

Experiments in Geometry.

TO take the Altitude of a building by a Line and Plummet, the Sun shining. 173
To take an *Altitude* by a bowl of water. 174
To finde the *Altitude* by two sticks. 175
To finde a Distance by two Sticks. 177
To measure the solidity of a Cube. 178
To measure the solidity of an irregular body. ibid.
How to measure any part of a solid body. 180
How *Archimedes* discovered the deceit of a Goldsmith. 181
How a man may descend into the bottome of any River, his body remaining dry. 183
Of building of Ships. 184
Of a Ship that cannot be drowned. 185
How to metamorphose a picture. ibid.
To break a stick upon two glasses of water. 186
To make a glasse of water boil. 187
To know the hour of the day by the hand and fingers. ibid.
How to make two Images, one of which shall blow out, and the other light a Candle. 188
How to disguise an Image that you cannot tell what to make of it, except your eye be seated in one direct point. 189
To make a Clock with one wheel. 190
To finde what is hidden in two hands. ibid.
To make a Cone to move on the edge of a Table. 191

A rich Cabinet with variety of Inventions.

RECEIPT. I.

How to make a glorious light with a Candle, like the Sun-ſhine,

THis is a rare Conceit, and fit for thoſe Artiſts, or others that perform curious and fine works by Candle-light: as Jewellers, Ingravers, or the like, or thoſe which are weak-ſighted to read by, never dazeling the eye.

Goe to the Glaſſe-houſe, or Glaſſe-ſhop, and let them blow you a thin round Globe-glaſſe, bigger then a penny Loaf, (the bigger the better) with a ſhort neck like a Bottle, they know how to make them. When you have this Glaſſe, with Glew or VVax binde a piece of Tape or Pack-threed, about the neck or top, making a little loope there-with to hang by; then fill your Glaſſe with the pureſt Conduit or Spring-water you can get (putting ſome Aqua-vitæ therein to keep it from freezing) ſtopping it cloſe, to keep the duſt out; having thus done, if you will uſe it at a Table or Beuch, knock a Tenter-hook or Naile into the Seeling or Shelfe, and with a

Tape or Pack-threed faſten it to the loop, and hang it up; (but a round ſtick were better to hang it on, putting it into a poſt or hole in the wall, that you may let it higher or lower at your pleaſure in turning the ſtick:) then behind your Glaſſe ſet a Candle lighted upon the Table, and you ſhall have a glorious light through the Glaſs and water for your purpoſe; behold the Figure following.

Some uſe to place a ſheet of oiled paper betwixt them and a candle, and this will cauſe a good light.

RECEIT II.

How (for a Wager) to cleave a thin Groat, or other piece of Silver in ſunder, like two Groats.

THis to many will ſeem impoſſible, yet may thus be done. Take three ſmall pins, and prick them down upon a board, or table triangular-wiſe, and then take a thin whole Groat, and lay it level on the heads of the three Pins, as you ſee in this ſame Figure; having thus done, take a piece of Brimſtone and

and bruiſe or beat it to powder, covering the Groat therewith, all over, in a pretty thickneſſe, and then with a lighted piece of paper, or a candle, ſet the Brimſtone on fire untill it be conſumed; when this is done, and the fire out, you ſhall ſee the edges to open a little like a dry Oiſter, then take a Knife and put into it, and it will eaſily cleave in ſunder, having the impreſſion on both ſides very perfect.

RECEIT III.

To lay one end of a ſtaffe or ſtick upon a ſtoole, or table, and to hang a Paile full of water at the other end, having nothing to hold on the ſtick, nor nothing under the Paile.

TO performe this conceit, doe thus, Lay one end of a Staffe or Stick a pretty way upon a table, or Stoole (ſo that it roule not off) letting the other end hang over the table likewiſe, (as you may ſee in this Figure here expreſſed,) then take a Paile full of water, and hang the bayle or handle upon the ſame; but you muſt have another ſhort ſticke that will reach juſt from the inſide of the bottom of the paile,

to the long ſticke on the table, placing the ſhort ſticke juſt under the bayle very ſtiffe, and then ſhall the Payle of water hang from the ground upon the long ſtaves end on the table without falling, ſeeming very ſtrange, but; this is ſomething difficult at firſt, till you hit juſt in the center of gravity: yet I have often done it.

RECEIT IV.

How to make dainty ſport with a Cat.

IF you will have ſome ſport with a Cat, then get a little Bel, ſuch as the tame Hawkes have at their legs, and tye the Bell ſomething hard at the end of the Cats tayle, and let her go, ſhe feeling of her tayle ſmart, and hearing of the Bel gingle, ſhe will run up and down as if ſhe were mad, flying againſt the walls and windowes: then if ſhe can, ſhe will get into ſome hole to hide her ſelfe, but when ſhe wags her tayle never ſo little, then out ſhe comes, and is as mad as before, and never will reſt in quiet till it be taken off, or ſhe can get it off her ſelfe.

Another.

Some have ſhod a Cat round, with putting melted Pitch into ſoure Walnut-ſhels, and placing her feet therein, and ſhe will make pretty ſport.

Another.

I was told of a merry Fellow that came into an Ale-houſe in cold weather, and finding but a reaſonable Fire, ſaid, Hee would make the Cat piſſe it out, and watching his opportunity, he getteth his Hoſteſſes Cat, putting her head betwixt his thighs, and

and holding her foure feet faſt in one hand, and with the other hand held up her tayle neer the fire, and did piſſe ſuch abundance that ſhe quite quenched the ſame.

RECEIT V.

How to make very pretty ſport with Ducks, or Poultry.

ONe Summers day my ſelf and two or three Friends, walked into the Fields for our recreation, and being dry and hungry, we went to a Victualling-houſe in a Country Village, where we could get nothing to eat but Bread and Cheeſe, and ſitting in an Arbour, the Womans Ducks being neer us, we flung them our parings of Cheeſe, the Ducks were very greedy of the ſame, (then quoth one of our Company.) I will ſhew you ſome ſport.

Preſently he getteth about a yard of ſtrong thread, and finding a little rag of red cloath, tyeth it to one end of the thread, and at the other end tyeth a piece of Cheeſe (ſome what leſſer then a Beane) with part of the rind on, and throweth it amongſt the parings to the Fowle, preſently one of them ſwalloweth it down, now the reſt of the thread and the Rag dragged behind her, and ſhe wadling up and down, perceived the red Rag to follow her, of which ſhe was ſore afraid, then ſhe did run from place to place, not knowing what to doe; at length ſhe tooke wing and flew into a Pond of water, and there ſhe quackt, but preſently ſhe ſpy'd the rag to ſwim after her, then downe ſhe dived, then up a-

gain, then downe, then up, at length out of the Pond again in her former poſture, at which the Woman was amazed, and thought her Duck was bewitched: But at the length the threed was tangled at ſome buſh or other, and ſo broke, or puiled the Cheeſe out of her belly, and then ſhe was quiet.

The like ſport you may have with other Poultry, by tying a long white Gooſe-quil, (or a light ſtick with a rag on the top) upright at her tayle.

RECEIT VI.

How to have pretty ſport at Cock-fighting, with a ſingle Cock.

TAke a pretty big Looking-glaſſe, and ſet it againſt a wall on the ground in any Roome or other place (not full upright,) tying the ſtring of the Glaſſe with a nail to keep it from falling: then put a Cock into a room, and throw ſome crums neer the Glaſſe, and when he ſeeth his picture therein, you ſhall have dainty ſport with him, for he will fight vehemently with his owne ſhadow, ſuppoſing there is another Cock, for as he moves, ſo doth his ſhadow: ſometimes with his motion he looſeth it, and then he will look behind the Glaſſe for the other Cock, and not finding him, he will clap his vvings and crovv, as though he had got the victory: but ſpying it again he vvill begin a freſh battle.

If you pleaſe, you may hold the Glaſſe in your hand moving it up and dovvn, and he vvil doe the like.

RE-

RECEIT VII.

How to know the hour of the day or night at any time, by a Ring and a Glaſſe, being a dainty clock.

TAke a ſmall Threed, and put it through a Gold Ring, or other like Ring, and doubling the Threed, tey a pretty big knot at the end, and cut it off, let the doubled Threed be ſeven or eight inches long, then take a Bole-glaſſe, and ſet it on a Table, and hold the knot of the thread ſomething hard betvvixt the ends of your fore-finger and your thumb, as you ſee here in the figure, vvhich vvill cauſe the Pulſes of your vvriſt to beat; let the ring hang in the middle of the glaſs a little within the rim, then the vvorking of your Pulſe vvill make the Ring to move ſtriking upon the ſides of the Glaſs the houre of the day or night, and then the Ring vvill ſtand ſtill again.

RECEIT VIII.

Another excellent Rule, to know the houre of the Day or Night at any time.

IF any two (or more) Parties be in company together, let one of them take ſomething from the Ground, (what they pleaſe) and give it to another Party ſtanding by.

Now, if the thing taken up hath growne, and may grow againe, as Seeds, Hearbs, or the like, it is then 1. 4. 7. or 10. of the Clock, or very neare.

If it did never grow, nor never ſhall, as Stones, Metals, Pot-ſheards, Glaſſe, or the like, it is then 2. 5. 8. or 11. of the Clocke, or very neare.

But if it hath growne, and will never grow again, as Sticks, Chips, Shels, or ſuch like, it is then 3. 6. 9. or 12. of the clocke, or very neare.

But remember this Caution.

That both they that give the judgement, and they that taketh up the thing, doth not know what houre it is before they try the Conceit.

RE-

RECEIT IX.

How to ſpit three Capons upon one ſpit at once, and to have an equall fire at each of them, yet one ſhall be quite raw, the other be well boyled, and the third thoroughly roaſted.

I Have heard that this Conceit was performed by a Noble-mans Cooke upon a Wager, and thus he did it. To tend the firſt Capon hee had a Boy that continually baſted and poured cold water on the ſame, and ſo kept it raw.

To the ſecond, he had another like attendant to baſte, and poure continually ſeething and ſcalding water, and that was well boyled.

The third he tended himſelfe, baſting it with Butter, and that was thorowly roaſted, and ſo he won the wager.

RECEIT X.

How to make two Knives (with a ſhort ſtick) to hang upon the brim of a Glaſſe without falling.

TAke a little ſtick, ſome foure inches long, and make it ſharp at one end like a Butchers Scure, and then get two Knives, ſomewhat of an equall poiſe, and pricke the points of them towards the bigger end of the ſtick, on each ſide ſlope-wiſe, as you

you may ſee here, in the Figure; then put the ſmall end of the ſtick upon the rim of a Glaſs of wine or beer, & you may take up the Glaſſe and drink, and they will not fall off.

RECEIT XI.

A ſpeedy way how to make a Horſe fat, plump, and luſty.

TAke *Commin-ſeed*, *Annif-ſeed*, *Enula-campana*, and *Turmerick*, a penny-worth of each, ſeeth them well with three heads of Garlick in a Gallon of Ale, then ſtraine it, and preſſe out as much of the ſubſtance as you can well wring out, and give it your Horſe to drink bloud-warme, a full quart at once, then ride him till he be hot, then afterward ſtable him, curry and litter him well untill he be cold, doe this two or three mornings together, and then turne him to graſſe, & he will thrive wonderfully in a ſhort time: if there were a handfull of *Groundſell* ſodden with the afore-ſaid ingredients, it would doe well.

Now if you will not put him to Graſſe, but keep him in the Stable, give him to eat with his Provender ſome of the roots of *Enula-campana*, with ſome *Commin-ſeeds* beaten together, or the *Enula-campana* ſhred

ſhred ſmall, ſhred for fourteen dayes together, this will make a leane Horſe to thrive, and grow fat in one moneth more then he would otherwiſe have done in a quarter of a yeare.

RECEIT XII.

How to keep a Horſe from tyring by the way, and to make him ſome at the Bit.

WHen you are to ride; and fear that your Horſe may tire, carry with you (in ſome lethern Bag) a good quantity of the powder of *Enula-campana*, and when others doe baite their Horſes in their ordinary manner, your Horſe being firſt well walked, rubbed, and littered, then give him a good handfull of your powder, in a quart of ſtrong Ale or Beere, with a horne, tying his head high to the rack, and you need to give him no other Provender, (or very little) till night, then let him be well meated, & give him in the morning tvvo pennyvvorth of bread, and his Ale and Povvder, but remember to vvater at night.

RECEIT XIII.

How one may put his finger, or waſh his hands in melted Lead, without danger, or burning.

TAke an ounce of *Quick*-ſilver, tvvo ounces of good Bole-armoniack, halfe an ounce of Camphire, and tvvo ounces of Aqua-vitæ, then mingle them

them together, and put them into a brazen Morter, and beat them vvith a Peſtle, having thus done, annoint your hands all over throughly vvell vvith this oyntment, and then you may put your finger into melted Lead, or you may vvaſh your hands therevvith, if one poure the Lead upon them, and it vvill neither ſcald nor burne you.

RECEIT XIV.

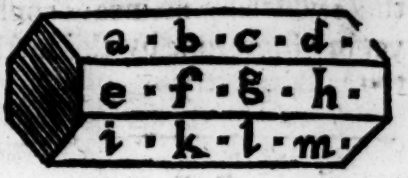
A very pretty and ready way to teach Children or others, ſuddenly to learne their A B C *in manner of play.*

CAuſe four peeces of Bone or Wood to be cut into ſix ſquare like Dice, & upon every ſide or ſquare let one of the letters of the Alphabet be ingraven or writ, as, A.B.C.D.E.F. upon one of them, then G H I K L M on the other, and ſo of the reſt in order, as you may ſee here in the Figure.

Novv the Child taking delight, and uſing to play vvith them (amongſt other Children and being told vvhat Letters are uppermoſt, vvill ſoon learn their Alphabet, as it vvere by the vvay of ſport and paſtime.

Alſo, you may cauſe one piece of bone or vvood to be made into into ſix long ſquare ſides, about an inch and a halfe of length, and let each ſide be ingraven, or vvritten vvith foure Letters as a.b.c.d. and ſo of the reſt of the ſides, and let them throvv

throw it, and name those Letters which are uppermost; and when they have learned the great Letters, you may write the small Letters on, as it is here on the Figure.



RECEIT XV.

An excellent way to teach one to read speedily, and truly that before could not distinguish their Syllables.

Let a Schollar, or one that can read well, take any Book of small value, and at every Syllables end underneath, or at the top; wit a small Pen of Inke, let them make a little speck or mark: but if the speck or marke were made with red Inke it were the better; Or if it be in a Book that you would not deface, then take a small Pin, or Needle, and prick little holes at each Syllable, which will hardly be perceivad. This experiment is best to be made with hard words of many Syllables, as in the example following.

Abraham, Achitophel, Bartholomew,

Christopher, Demetrius, Anabaptist,

Mathematician, Nebuchadnezar, Quotidian, Patrimony, &c.

These

These to the ingenious will suffice, for I have known those which by no means could be brought to read, yet in a short time by this method they have learned to read perfectly.

RECEIT XVI.

Of divers rare and dainty conceited motions, performed by the operation of the Magnet, *or* Load-stone.

MAny and wonderful Mathematical conclusions are performed by the *Magnet*, or *Load-stone*, only I will give a touch at some few for recreation.

These stones are to be had at the Iron-mongers, but they ought to be polished and made fit by a cunning Artist. This stone hath his two Poles, one North the other South, answerable to the Poles of the world For if you take a piece of foure or five Inches long, and touch one end thereof with a Load-stone: and then thrust it through a piece of Cork, putting it to swim in a Bason of water, presently you shall see one end of the Wyre will turne full North, and the other full South.

This receit is profitable for some Travellers, who having a Sewing-needle about them that is touched with this stone, may pricke it some in little light piece of wood or Corke, and place it in the water, and it will set out the North and South instead of a Compasse.

If for recreation you take two Wyres, & put each Wyre into a Corke, touch one Wyres end with the North end of the Stone, and the other Wyres end with

with the South end of the ſtone, and then put them both into a Baſon of water a pretty way aſunder, yet they will begin to move and ſtirre, and draw nearer together, and on the ſuddaine joyne and meet. Now if upon thoſe Wyres or Corkes there were placed little paper Tilters on Horſe-backe, they would run their courſe at one another in the water very prettily.

Alſo, if this ſtone or Magnet, be incloſed in a box of Wood, Stone, Silver, or Braſſe, yet it will extend its operation and working by many pretty and ingenious practices, admirable to behold.

As for Example, if you will make the formes and pourtraitures of divers things in thin Paſt-board, as Horſe-men, Foot-men, Ships, Boates, Beaſts, Birds, Flyes, Wormes, Serpents, or the like, you may cloſely convey into them a ſhort piece of Wyre, and them upon a Board, Trencher, or Paſtboard, and if you will have them move or walke, then hold the Load-ſtone cloſe in your hand, under the Board, and that way which you move your hand underneath, that way the images will move and creep on the top.

Alſo, if you place the Load-ſtone privatly to, or neere the Seeling, or over a Doore, and then hold a piece of Iron neere to it (tying a threed to the Iron) that it touch not the ſtone, which will attract it, and then the Iron vvill ſeeme to hang in the Ayre. If you touch an Iron Ring vvith this ſtone, it vvill take up a dozen or more rings together, hanging one to the other like a chaine. Alſo, if a knives point be touched therevvith, it vvill take up Needles or vvyre, and by it you may knovv the counterfeit, or Nevv-gate halfe-penny, as ſome call them.

Many

Many other rare concluſions may be performed by this ſtone, which I forbeare to write of. Fire, Garlick, or Onions, ſpoyleth the vertue of this ſtone; therefore let it not touch or come neare them.

RECEIT XVII.

The making of the Thermometer, or Weather-Glaſſe, whereby you may certainly fore-tell the alteration and change of the weather, a good many houres before it commeth to paſſe.

THis Weatherglaſſe is compos'd of a quantity of Water and Aire Artifically incloſed therein, the water being ſubject to a continual motion (either up-ward or down-ward) as the weather changeth: The Glaſſes you may have ready made at the Glaſs-ſhops, but be ſure to chuſe the longeſt and ſlendereſt ſhanked Glaſſes, with a ſmall head, for they are beſt: You muſt alſo have another Glaſſe for a Ceſtern at the bottome to receive the water, the framing of it is thus.

Make a frame taper-wiſe of ſome fine light Deale or other wood, (only let the bottome boart be ſomewhat thick and heavie to make it ſtand the ſteadier,) and let the head or uppermoſt board be leſſer then the bottome, having a hole in the middle to put the glaſſe through, as you may ſee in the Figure.

Your

Your Frame ſhould be about a quarter of an inch longer then the ſhank of the glaſs becauſe the lower end of the ſhank ſhould almoſt reach to the bottom of the ciſtern: Now before you put in your Glaſſe, you muſt divide the ſhank into certain degrees, from 1 to 12 or more beginning from the rim of the Ciſtern, upwards, placing figures thereon, having thus done, turne the head of your long glaſſe downward, & with a Funnel fill it almoſt full of water, then put the Ciſtern on the bottome board, and holding the frame ſloping, put the ſhanke of the Glaſſe (through the hole at the head) into the Ciſtern, and then ſet it upright. Now you muſt know at what degree to ſet your water, according to the ſeaſon of the year: for if it be in Summer & very hot weather, then to ſet it at one or two degare beſt, if the weather be temperate, then three or foure, but in cold or froſt ſet it at nine or ten. To hitt theſe degrees, (if your water be not low enough) you muſt pull up your Glaſſe a very little way from the bottome of the Ciſtern, & very ſuddenly put it down

again, if yet it be not at the right degree; pull it up again; and quickly down (as before) till you have your desire.

But take heed, for if your water be fallen to low in the Cisterne, then you must take them out, and begin your work again, When it is thus done, wax or cement your Glasse and Cisterne together, and then you may cover and make a rock about your Cistern, with Past-board or the like, glewing or pasting pieces of Mother of Pearle shels, Smiths Cinders, pieces of Glasse, Antimony, or other shining things what best pleaseth your fancy; or you may cover it with Mosse, or the like, and it is finisht.

The quality of the water in this Glasse, is to ascend by degrees with cold, and to descend with heat; for in the Winter the vvater vvill be at the top of the Glasse, and in Summer dovvn to the rock. The vvater ought to be very cleere, and coloured by Art, both for ornament, and the plainer to distinguish it from the Glasse: If you will have it green, use Verdigrease, if yellovv, use Saffron, or Turmerick, if red, use Brasil, or Turnsoile.

The use and property of the Glasse.

By the uncertain motion of the vvater in this Glass it is a certain signe of fickle and unconstant vveather, but contrary, the continuance of the vvater at any one degree, is a sure token that the vveather vvill continue at that stay it is then at, vvether it be faire or foule, frost or snovv. But vvhen the vvater either riseth or falleth, the vveather vvill then presently change: Also, the sudden falling of the vvater is a sure token of wet vveather.

R E-

RECEIT XVIII.

A prety way to catch Kites, Ravens, Crowes, Magpies, or the like, a live.

GOe to the Apothecaries, and beſtow two pence in *Nux vomica*, then beate them to powder, or ſlice it as you doe Ginger, this being done, take raw Fleſh or Liver, & cut it into little pieces or gobbets, that the Fowl may ſwallow them whole, then cut holes in the ſame, & put your powder or ſlices therein, and then lay theſe pieces where they haunt, but as ſoone as they have ſwallowed down the ſame they will flye to the next high Tree they can come at, and this preſently makes them ſo drunk, or ſick, that they ſtreight will fall down from the top of the tree to the ground, that you may take them up alive with your hand: But you muſt be ſure to watch them, and run preſently to the tree, for they will ſoone recover and flye away.

I believe if it were ſodden with other Grain, it would have the like operation with other Fowle.

RECEIT XIX.

A ready way to catch Pidgions, or other Fowle.

TAke pieces of brown Paper, & roule them round making Coffins of them, ſuch as the Grocers make to put their Fruit in, let them not be above a finger long, paſt the ſides and ends of them with ſome ſtarch, clip the upper part of them round with a paire of Sheeres, then annoint the inſide of the uppermoſt skirts of them round about with Birdlime or ſome ſtuffe that will but cling to the Feathers: But

ſyou muſt (a day or two before you uſe it,) lay or trevv ſome Peaſe or other Graine to make them haunt the place, and they vvill be the leſſe fearfull, then if you pleaſe make a hole in the ground a little vvay and put your coffins upright or ſloping therein, a fevv Peaſon or Corn in them, ſtrewing here and there Peaſon neare them, & vvhen ſhe picketh, into the coffin ſhe is immediately hooked, and blind-folded, not ſeeing vvhich vvay to flye, and thus you may take them eaſily.

RECEIT XX.

A merry Receit, being a ready and ſure way how to catch a Pick-pocket.

AS I vvas vvriting the former Receit, it put me in minde of a prety conceit that a Friend once related to me, which vvas thus; A Gentleman being in a throng in a Faire, had his Purſe pickt out of his pocket, hee miſſing it vvas ſome-vvhat vext but could not mend it, but ſtudied hovv (if he could) to be revenged: preſently he buyeth two penni-vvorth of Fiſh-hookes, & cauſeth a Taylor to ſovv them round about toward the upper part of his pockets, with the points of them down-wards, & ſo the next day away he goes to the Faire again amongſt the throng, throvving his Cloak on one ſhoulder, ſeeming careleſſe of his pocket, vvherein he had ſtore of mony: Preſently there vvas a Diver nibling at the baite, and nimbly had his hand in his pocket: The Gentleman being vvary (perceived that the Fiſh had ſvvallovved the hook) gives a jerk aſide, vvhich cauſed the hooks

to

to catch good hold in his hand, and then he had him ſure: Then ſaid the Gentleman, Fellow, vvhat maketh thy hand in my pocket? O good Sir, (replyed the Pick-pocket) pardon me, I can not pull it out: Come (ſaith the Gentleman ſoftly to him, becauſe no body ſhould take notice) go along with me; So cheek by joll they walked together, with his hand faſt in the pocket (but covered vvith his Cloake) and to a Taverne lovingly they goe together, vvhere the Gentleman told him of the loſſe he had ſuſtained the day before, and making of him to reſtore backe his mony, he cut out his pocket, and let him goe. Surely this Pick-pocket had good ſtore of picking vvork to get the hookes out of his hand again.

RECEIT XXI.

How to make Fowles and other ſmall Birds drunke, that you may take them with your hands.

YOu muſt obſerve vvhat meat they love, or uſe to eat, as Wheat, Barley, or other Grain, and lay the ſame to ſteep in the Lees of Wine, or in *Aqua-vitæ*, or in the juyce of Hemlock, and ſtrevv the ſame Graine in the places vvhere the Birds doe haunt.

Another.

Take Tormentil, and boyle it with ſtrong Wine, Wheat, Barley, or other Grain, then ſtrew this in thoſe places wher you intend to take them, or vvhere they uſe to haunt, and the Birds vvill eate the pieces amongſt the graine, vvhich vvill make them ſo drunk that they cannot flye avvay.

Another.

Make Paſt with Barley meal, Onion blades, and Henbane ſeeds, and put or throw it where the Birds doe haunt.

Theſe experiments are beſt to be done in Winter in a deep Snow.

RECEIT XXII.

A dainty way to catch Fiſh in a darke night, with a Candle under Water.

GEt an Urinal, and put prety ſoft clay therein, and with ſomething that is flat at the end preſſe the clay gently to the bottom of the glaſſe, ſmoothing it as well as you can, then take a ſtick and ſhape it about the bignes of a Candles end, wet the ſtick, and put it into the neck of the glaſſe, making a hole in the middle of the clay, as you make clay candle-ſticks; then make a little hoope of a Willow ſtick, and tye pieces of corke in foure places of the hoope equally diſtant, and get a thin light round piece of board, and with foure little ſticks of an equall length, tye one end of them to the Corks, and the other ends faſten to the board to ſupport it, as you may ſee here in this Figure.

In the board you muſt make a hole in the middle to put the neck of the Glaſſe through & there tye it, and make a loope with a ſtring to the board that you may with a long pole put it into the water: when you will uſe it, put your Candle into the glaſſe in the clay ſocket, a little below the brim, that the wind blow not the light out. If you pleaſe, you may with Wax or Glew put little pieces of Looking-glaſſes, or other Glaſſe under the board, on the ſide next the water, and this light will ſhine a great compaſſe in the vvater, that the Fiſh vvill ſtreight reſort to the ſame, where you may very eaſily take them with a Net.

This might be done with the Glaſſe alone, by tying Corks about the neck of the Glaſſe, to keep the mouth above vvater.

RECEIT XXIII.

An excellent Bait to catch Fiſh with an Angle.

MAke Paſte with fine Wheat-Flovver, tempered vvith a little Saffron and Sugar, and bait your hooke there-vvith, and they vvill bite apace. This is a good bait for Roach, Dace, and ſuch like.

Another.

Take the crum of a new penny White-loafe, and an ounce of *Coculus India*, and an ounce of Henbane-ſeed finely powdered, temper the ſame well with good *Aqua-vitæ* into a Paſte, and divide them into ſmall pieces, bigger then graines of wheat, and then caſt handfuls in at once into the water where is ſtore of Fiſh, and you ſhall preſently ſee the operation of the ſame.

RECEIT XXIV.

How to make one Watching-candle, that it ſhall out-laſt three Watching-candles.

TAke a Paile, or Bucket, and fill it full of water, & ſet it in the place where you intend that your light ſhall ſtand: then take your Candle and warme it at the lower, and there ſtick a braſſe farthing token, or ſuch like; and when you will light your Candle, put it gently downe into the middle of the water, (but be ſure that the bottome of the Candle doe not touch the bottome of the Paile) and then it will ſwim upright to the very edge neer the light. The reaſon that the Candle will laſt ſo long, is cauſed by the coldneſſe of the vvater, and this is a ſafe vvay that no Rat can run avvay vvith the Candle lighted, as I have heard that they have done; by endangering the houſe vvith fire.

RE-

RECEIT XXV.

How to write any name or mark upon a Paper, and then burn it to aſhes, yet afterward it may be read plainly.

TAke a nevv clean Pen that vvas never vvritten vvithal, and dip in your ovvne vvater as you doe in Inke; then ſtrip up your Shirt-ſleeve above your vvriſt, and upon your arme vvrite your name, or any name, or any mark, and then let it dry on your skin, and nothing vvill be ſeen; then put dovvn your ſleeve and button your vvriſt. (Doe this privately & it vvill cauſe ſome to vvonder:) then take a piece of vvhite paper, and vvrite your name, or the mark thereon, vvith another Pen of black Inke, (but let it be vvritten as like the other as you can) then take the paper and burne it, and lay the aſhes on a Table, and ſtripping up your ſleeve, rub the aſhes hard vvith your finger, vvhere you had vvritten vvith your vvater, then blovv off the aſhes, and the name or marke vvill plainly be read on your arme in black letters.

RECEIT XXVI.

How to ſee plainly any thing in a dark Roome, in at a Doore or Window, ſtanding a great diſtance off.

IF there be never ſo darke a Roome, with a Doore or Window open; Take a Looking-glaſſe in your hand, and hold it againſt the Sun, at a great diſtance from the Doore or Window, and moving the Glaſſe up

up and downe, till the reflection of the Sun be upon your object, and then you may perfectly behold any thing in the Roome, or see to read a Letter.

Some unhappy Boyes use to dazle peoples eyes with a Glasse in this order, as they walke the streets.

RECEIT XXVII.

How to view the back part of your head by Glasses.

IF you would behold the back part or shadow of your Head (for a wound, or the like) take a Looking-glasse, & hold it behind your head, and then take another Looking-glasse and hold it before you, and from the Glasse behind, you may see your shadow in the Glass before you.

RECEIT XXVIII.

A pretty tricke to tell, or name all spots or court Cards in the Pack, and yet never see them.

YOu must privately drop a drop of water or drink (about the bigness of a two-pence) on a table before you where you sit, and let any body shuffle the Packe of Cards, and then taking them into your hand, place a candle on the table before you for this trick is best to be done by Candle-light) and holding downe your head (as you may see in the Figure) lift the Cards above the brim of your Hat, close to your head, that the light of the Candle may shine on the Cards; then in the drop of water (like a Looking-glass) you shall see every speck of each Card before you draw them, which you may name; or putting your finger upon the spots,

ſpots, you may ſay that you feele them out; then lay downe your firſt Card, and name the next, as your firſt Card was the Deuce of Clubs, the next is the five of Spades, and ſo of the reſt.

RECEIT XXIX.

How to keep or preſerve any Fowle, Veniſon, or other pieces of Fleſh, ſound and ſweet for three weeks, or a moneth together, although the weather be never ſo hot.

MAke a ſtrong Brine with Bay Salt and white mingled together, ſo as the water be over-glutted with Salt, and being ſcalding hot, parboyle therein the Fowle, or Fleſh which you intend to keep for ſome reaſonable time, (that is to ſay, according to the greatneſs and greaſineſs thereof,) then hang it up in a convenient coole place, and it will laſt a ſufficient time, without any bad or over-ſaltiſh taſte.

This is a good way for Sea-men, and others in hot countries, who are inforced ſometimes to victual themſelves in ſuch intemperate climates, where no fleſh will laſt

laſt ſweet foure and twenty houres together, by reaſon that they have no meanes to make the ſame to take Salt, which without all queſtion will entet this way, & make penetration very ſpeedily, by reaſon of the hot and fiery ſpirit of Salt thus prepared.

RECEIT XXX.

How to make a ſpeedy or preſent Drink that Travellers may brew for themſelves, when they cannot reliſh their Beer or Ale at their Innes.

TAke a quart of good vvater, put therein five or ſix ſpoonfuls of good Aqua-vitæ, and an ounce of Sugar, with a branch of Roſemary, brew them a pretty while out of one pot into another, and then is your drink prepared.

RECEIT XXXI.

How to make on the ſuddaine, good drink for Mariners, Souldiers, or for poore people, when Beer is ſcant, and Malt deare.

IN time of extremity, theſe drinks following will ſerve to ſuffice nature (as hath been often proved;) Put a good quantity of wholſome faire water, a ſmal portion or few drops of the Oyle of Sulphur, incorporating them well together, and it is ready.

Another.

One drop or two of the Oile of Vitrioll added to a good quantity of faire water, and well ſtirred together, it performeth the like.

Some

Some mingle Vinegar with good water, and it ſerveth very well to quench the thirſt.

Others will carry a piece of Allom in their pocket if they are to travel, and know not how to get drink or vyater; and when they are a dry, they put a piece of that in their mouth, and it wil fetch up moyſture, which will aſſwage the thirſt.

RECEIT XXXII.

A profitable way to harden Leather, that it ſhall outlaſt other Leather a long time.

THis is a good and profitable Receit for many poore labouring men, and is thus performed, Take and lay ſuch Leather as is well tanned to ſoake in water, wherein there hath been ſome ſtore of fylings of Iron, a long time, or elſe in the water that hath long laine under a Grinding-ſtone, into which ſnch Iron as hath been from time to time ground away, and there ſetled.

This is good alſo to harden Leather for the Cawkers, or Pumps of Ships, or others, to make them laſt long.

RECEIT XXXIII.

An excellent Receit to make a dainty ſtreight Walking-ſtaffe to have knobs where you pleaſe.

GEt a ſtreight piece of wood (of your deſired length,) of Holly, Aſh, Service-tree, Walnut-tree or Peare-tree, let it be free from knots, or ſhakes, then plaine it into ſix or eight ſides, a good deale bigger then your

your Staffe ſhall be; this being done, get a ſhort Punch of Iron, and let the ſmall end be filed about the bigneſs that you intend your knobs ſhall be filed about a bench or table, and where you will make the knobs with a hammer punch holes therein, and ſo doe on every ſide, then plaine it over againe, till you have made your ſtaffe ſmooth, that there be no dents ſeen thereon; when you have thus done, put it into ſome cauldron of boiling water for a good ſpace, and when you take it out again, you ſhall ſee that it will be full of knobs, for with the heat of the vvater it forceth the bruiſes (which were made vvith the Punch) to ſwell out of the vvood again.

You may file your Punch like a Starre, or other work, and it will ſhevv very prety; I once ſaw a Partizan, or Captaines Leading-ſtaffe, vvhich was done in this manner, and being put into a Dyers Cauldron when he dyed blacks, and being dryed, and rubbed vvell vvith Linſeed-oile, it ſhewed like Ebony.

RECEIT XXXIV.

How to write Love-letters ſecretly, or from one Friend to another, that cannot be diſcovered.

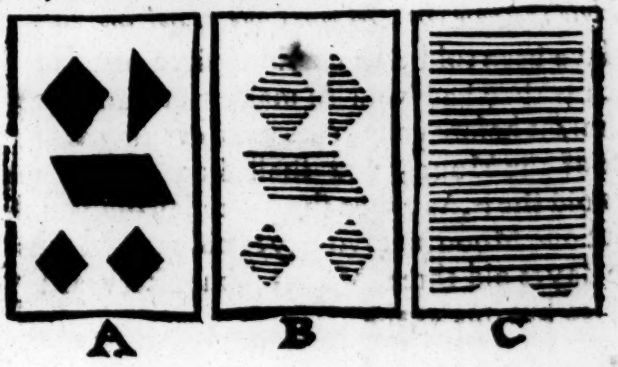
TAke a ſheet of white Paper, and double it in the middle, then cut holes through both the halfe ſheets, let the holes be cut like the panes of Glaſſe-windovves, or other formes what you beſt fancy, and then vvith a Pinne prick tvvo little holes at each end, & cut your Paper in two halfes, give one halfe to your Friend (to whom you intend to write) the other halfe

keep

keep to your ſelfe: Now when you doe write, lay your cut paper on a halfe ſheet of writing paper, and ſtick two Pins through the two holes that it ſtirre not, then through thoſe holes that you did cut, write your minde to your Friend; when you have done, take off your Paper with the holes again, and then write ſome other idle words both before and after your lines, but if they were written to make ſome little ſenſe, it would carry the leſſe ſuſpition; then ſeale it up and ſend it.

When your Friend hath received it, he muſt lay his cut paper on the ſame, putting Pins into the Pin-holes, and then he can read nothing but your minde which you vvrit, for all the reſt of the lines are covered, obſerve the Figure, and it is eaſily apprehended.

VVhere the Letter A is placed, that doth ſignifie the halfe ſheet of cut paper with holes; vvhere the Letter B is placed, doth ſignifie the ſubſtance of the Letter which you write, and vvhere the Letter C is, doth ſignifie the Letter filled up vvith lines to joyne to the other vvords. Novv vvhen your Friend vvrites to you, he muſt doe the like.



Ano-

Another.

VVrite a Letter (vvhat you pleaſe) on one ſide of Paper vvith common Inke, then turne your paper and vvrite on the other ſide vvith milke, (that which you would have ſecret) and let it dry; (but this muſt be written with a clean pen:) Now when you would read it, hold that ſide which is written vvith Inke to the fire, & the milkie Letters will then ſhew blewiſh on the other ſide, which may be perfectly diſcerned.

RECEIT XXXV.

How to know when the Moon is juſt at the full, by a Glaſſe of water.

TAke an ordinary Drinking-glaſſe, and fill it full of water up to the very brim, ſo that it doth not run over, let this be done a little before that the Moon be at full, and then at the very inſtant that the Moon is at the full, the vvater vvill preſently boyl over.

RECEIT XXXVI.

How to know the Moones age at her increaſe.

I Have been told, that a thin piece of Cypreſſe, ſuch as they had wont to make Hat-bands of; if you hold it before your eyes in an evening at the increaſe of the Moon, you ſhall knovv hovv many dayes old ſhe is, As vvhen ſhe is one day old, you ſhall ſee but one Moon, at tvvo dayes old tvvo Moons, at three dayes old three Moons; but aftervvard you ſhall ſee but one again.

RE-

RECEIT XXXVII.

Another, shewing how to know both the Increase and Decrease of the Moon.

THe Moon giveth such vertue to a stone which is found in *Arabia*, called *Selenite*, of which *Pliny* and others do write, that within the body of the stone the Moon sheweth her self, and increaseth and decreaseth according to the course of the Heaven.

Another.

Our common House-cats also have this property by the predomination that the Moon hath over them; that their Eye-browes doe increase, or decrease each day, according to the course of the Moon, and her aspects; which thing is daily seen to him that pleaseth to note the experience thereof.

RECEIT XXXVIII.

A dainty way how to fetch Oyle, or Grease, out of Books, Writtings, Papers, or Garments.

GOe to the Apothecaries or Grocers, and buy a penny-worth or two of the Oyle of Turpentine, and put a drop or two upon the place which is Oyly or Greasie, rubbing it on, and then you shall see how it will drinkup the Oyle or Grease, and be presently dry and faire; for this Oyle of Turpentine is a great dryer, and is good to put amongst oyl-colours, to make them dry speedily.

RECEIT XXXIX.

How to refreſh & ſcoure old pictures that are wrought in Oyle, making them to look almoſt as freſh as if they were new done.

TAke the Picture out of the frame, then wipe, or bruſh off the duſt very cleane, & then lay it level upon a board, or table, pouring good ſharpe Vinegar all over the ſame, and there let it lye and ſoak for three or foure houres; if the Vinegar be dried up, then poure on more, continually keeping it wet: then beat a piece of dry bricke very fine to powder, (and ſee there be no lumps or ſtones therein, for they will raze and ſcratch the Picture) and then put the powder into a courſe linnen rag, and tye it, and then dip it well in a Porrenger of Vinegar, and with your rag and powder, rub, & ſcoure your Picture all over very hard, and then with faire water, or a wet clout, waſh the filth away: But if you ſee any ſpots or filth remaine, then ſcoure it again, and vvaſh it; then dry it very well with a cloath, and when you have dryed it, put it again into the frame, & ſet it in the Sun for a day or two, (for the Sun refreſheth the Colours very much) and then rub it hard with a dry woollen cloath till you make it ſhine, and then hang it up. This will cauſe it to look almoſt as freſh as when it was new.

Some uſe to waſh them in Soape, and then oyle or varniſh them over, but that is not good, becauſe that the Oyle or varniſh will turne yellow, and gather duſt.

RE-

RECEIT XL.

How to keep Sword-blades, Halberts, Piſtols, Knives, Edge-tooles, or other things free from ruſting for ſeven yeares, or more, in a dry houſe.

TAke Fiſh Glew, or Iſing-glaſſe, & cut it in pieces, then with a Hammer, beat or bruiſe it upon an Anvile, or a ſtone, and then put it into a little Skeller, or ſuch like, with water, and let it diſſolve over a gentle Fire, ſtill ſtirring it as you doe your common Glew; then when it is well boyled take it off, and with a Pencil, or ſmall haire-bruſh, lay the ſame, while it is hot, all over your Sword-blade as thin as may be, and then lay it to dry, and it is done. This thin coat keepeth the moyſtneſſe of the Aire from the Mettle, that it cannot ruſt; but when you are to weare it, or uſe it, take a blunt knife, and you may eaſily ſcale off the thin ſubſtance, and then it will be as bright as any ſilver.

I verily believe, that our common Glew will doe the like, keeping of it in a dry room.

RECEIT XLI.

An excellent Cement for broken Glaſſes, China-diſhes, or Cups, and ſuch like.

TAke one part of Virgin-wax, and two parts of the teares, or cleere drops, of Maſtick, melt them together, and Cement therewith. But the better is, if you

beat the whiteſt Fiſh-glew or Iſing-glaſs with a hammer till it begin to be clear, and then cut the ſame into very ſmall and ſhort pieces, and diſſolve and melt the ſame over a gentle Fire with Aqua-vitæ; then let one that ſtandeth by, hold both the pieces that are to be cemented over a chafing-diſh of coales till they be warm, and during their heat, lay on the diſſolved Glew with a fine Pencil, then bind the Glaſs with Wyre or Packthread, to keep it ſteady, and ſo let it remaine till it be cold and dry.

Another.

Take a little quantity of unſlack'd Lime, Wheat-Floure, and the White of an Egge, and incorporate them together, Maſtick, Aqua-vitæ, and white lead is good; ſo is Iſing-glaſs, being diſſolved & melted with Rheniſh-wine.

RECEIT XLII.

How to grave Arms, Poſies, or other devices upon Eggs, which may be ſerved at a table.

MElt Suet prety warm, and dip in your Eggs in this manner; hold the Egge between your thumb, and your fore-finger, & quickly dip one halfe therein, and hold it in your hand till it be cold, and then dip in the other end that it be thinly covered all over; then take a little Bodkin or Needle, and grave in the Suet what Letters or Words you pleaſe, then lay the egge thus ingraven in good Wine-vinegar, or other vinegar

in

in ſome ſtone Pot or Veſſel for the ſpace of ſix or eight houres), or more, or leſſe, according to the ſtrength or ſharpneſſe of the ſame, then take out the Eggs, and in hot water diſſolve the Suet from the Shels, then lay the egge to coole, and the worke will appeare to be graven in the ſhel of a Ruſſet colour. And if the Egge lye long enough in the Vinegar after it is ſo graven, the Letters or Workes will appeare upon the Egge it ſelfe being boyled, and ſo you may ſerve them up at the Table. And if you care not to loſe the meat, you may pick out the ſame, when the ſhell is through graven, and you ſhall have a ſtrange piece or work performed on the ſame.

RECEIT XLIII.

How to make Wax, either red or green.

TAke to one pound of Wax in ſummer, three ounces of the cleereſt Turpentine; but if you make it in winter, take four ounces of Turpentine, melt theſe together over a ſoft fire, ſtirring them with a ſtick, and when they are well melted together, take it off and let it coole a little, and then mixe with the ſame the red root of *Anchuſa*, or Vermillion ground an ounce; and an ounce of ſweet oyle; ſtir theſe well together again over the fire, then take it off to coole, and poure it into cold water, and then upon a wet board, and your hands wet, you may roule it into what forme you pleaſe. Inſtead of Vermillion, you may take three times as much Red-lead but that is not ſo good.

If you will make Greene wax (inſtead of Vermillion) take the like quantity of Verdi-greaſe.

RECEIT XLIV.

A pretty way how to caſt off Flowers in wax, of divers colours,

CAuſe a Stick to be turned round at one end, (ſomewhat Taperwiſe) like the faſhion of a Poking-ſtick, leſſer, or bigger, (according to the bigneſſe of the Flower you intend to caſt) and at the ſmaller end thereof, with your knife, cut tents or nicks in the ſame, long-wiſe as you ſee here in the

Figure: The letter A ſignifieth the Stick, the letter B ſignifieth the Flower: Then take a little panikin, and in the ſame melt your Wax with a gentle fire, and when it is melted take it off, and then take your Stick (having a Porrenger of faire water by you) & dip the end into the water, and then ſhake off the water, or ſuck it off, and then dip the ſtick into the Wax, & ſodainly pull it out again, dipping it into the water again to cool it, and then you may take off your Flower, & lay it by

by: and in this sort you may make as many as you please, For yellow Flowers, melt yellow Wax; for Red, red wax; for white, white wax; for green, green wax: Now for stalks for your Flowers, you may stick in a small wyre, or a Bent of a Raison-fraile, or the like. You may have the coloured wax ready made at any of the wax-chandlers.

RECEIT XLV.

How to make a Bunch of Grapes with Green Wax, that will seeme to be naturall.

YOu must get a little stick turned round at the end, about the bigness of an Arrow; and then have your vessel of green wax melted, (as was shewn in the former Receit,) dipping your stick in the same about the third part of an inch deep, and it will be almost in the fashion of an Acorn-cup, make a good many of them. Then take an Egge, and make a little hole in the bigger end of the shel, lesse then a penny, and get out the yolke thereof, and dry the shel; then with a piece of your green wax hold it to the fire, rub or daub the shel therewith thinly all over, then hold the shell in your left hand, and with your other hand take up first one cup, holding the same a little neer a candle to warme, and quickly stick it on your egge, and so doe with all the rest of the cups, till you have filled it all over; they must be set something close together. Now when you have

thus done, take a little ſtick, about the bigneſs of the tag of a point, and tye a pack-threed in the middle thereof, and then put the ſtick into the hole of the ſhell, and ſo hang it up: You may cut leaves like Vine leaves in green paper; and faſten them to the ſtring or ſtalk above the bunch: I have made ſome womens teeth to water at this conceit, they ſeeme ſo naturall to the eye; and theſe Grapes will laſt all the yeare.

RECEIT XLVI.

How to grave and In-lay colours into Gold, Silver, Iron or Copper, to ſhew like Ammel.

FIrſt, cover your Metttal with a cruſt of warme wax, and when it is cold, with a fine ſharp bodkin draw, or cut out the ſhape or proportion of what you pleaſe, either Letters, Flowers, Borders, or Scutchions, of a reaſonable largneſſe: then pour upon the ſame empty places (which you have ingraven upon the wax) ſome few drops of ſtrong water, or *Aqua-fortis*, and let them lye a while, and when you find them deep enough graven, mingle Orpiment and Maſtick melted together for a yellow colour, and vermillion and maſtick for a red, and Bice and maſtick for a blew, and Ceruſe for white, and Ivory burnt for a blacke. Now when your maſtick hath been melted with any of the afore-ſaid colours, let it coole, and then beat the ſame into powder, and lay the ſame powder within the graving, and after lay

lay the mettle upon a ſmall Char-coale fire till the maſtick be melted, and it will remaine faſt and firme therein a long time.

RECEIT XLVII.

How to In-lay Boxes, Cabinets, or other things with hard Wax.

WIth a Pen draw upon your Box any thing what beſt pleaſeth your fancy, as Birds, Beaſts, Flies, Flowers, Fruits, Leaves, Trayles, Anticks, Letters, &c. Then take a little knife ground ſharp at the point, and cut or grave out the worke pretty deepe which you have drawn with your Pen upon the wood, when you have ſo done, lay upon the ſame ſome red or green hard wax, & with a hot Iron melt and rub hard the wax all over into the crevices, or workes which you have cut out, and ſo let it coole: then take a knife and ſcrape away the wax to the boord, and then you ſhall have your work which you drew to be in-laid very perfectly in the colour of your wax, as though it were drawn with a Pen, and will never vvaſh nor vveare off, when you have ſcrapt it cleane, hold it a little to the fire, and it vvill fetch a gloſſe on the vvax, and make it to ſhevv the pleaſanter.

RE-

RECEIT XLVIII.

How to harden the white of Eggs into an Artifical Gum, fit for many uſes.

SEparate the vvhites of Eggs cleane from the yolks, & beat the vvhites very vvell into a cleare oyle, or vvater, and vvhen it is ſetled, skim off the froath: then put the ſame into Bladders, and hang them in a chimney corner, vvhere fire is uſually kept, to dry, and in a fevv dayes the ſame vvill become as hard as Gum Arabick: in hot vveather you may hang your Bladders in the Sun to dry: This Gum may be uſed inſtead of other Gums, and vvith it you may varniſh Prints, or other things that are vvaſhed in colours.

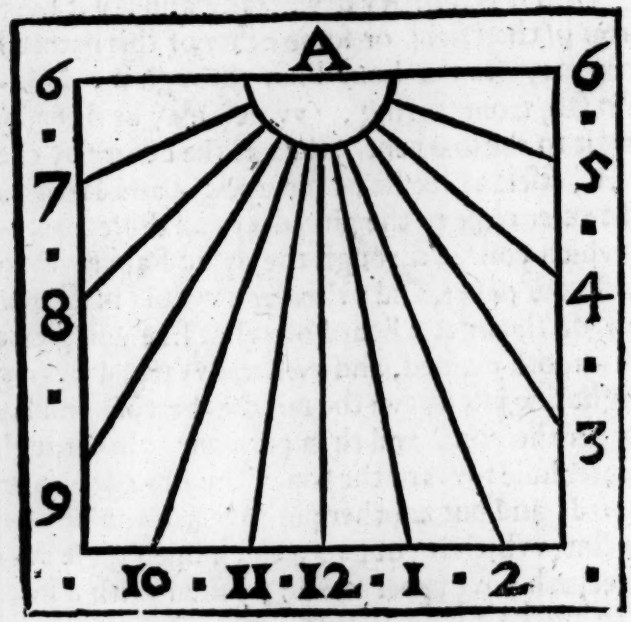
RECEIT XLIX.

How to make a true South Sun-dial, to be placed upright againſt a Wall, or on a Pole.

I Intend not to ſpeake of the multiplicity of Geometrical and Artifical ſorts, and making of Sun-dials, (of which many ingenious Artiſts have copiouſly written) a Mechanick way of two ſorts, for the benefit of ſome who vvould be glad to knovv hovv the houres of the day paſs avvay.

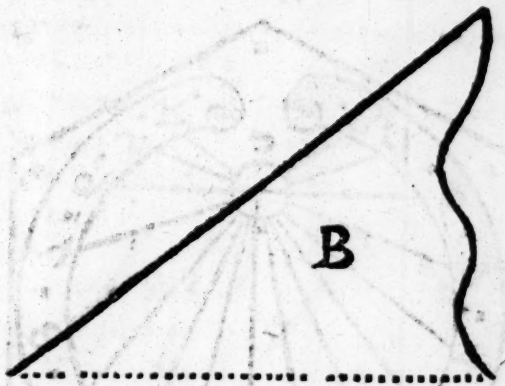
Take a piece of good vvriting Paper, and rub it over vvith Linſeed-oyl, and hang it to dry in the Sun,

Sun, vvhen it is thorovv dry, take and lay it over this print of the Dial (or ſome other of this nature) that you may ſee the hour lines through it, holding of it ſafe from ſtirring, (vvhich may be done by pinning it to the margent,) then at the center by the letter A, ſtick a Needle or pin upright and laying a ſtreight ruler cloſe to the pin, dravv all thoſe houre-lines vvhich you ſee through the oyled Paper; then take off your paper, and vvhen you vvould mark out a Diall, do thus; get a board of vvhat ſize you pleaſe that is ſmooth plained, and vvill not vvarp, dravving a ſtreight line juſt dovvn the middle thereof, and lay this paper thereon, and then put your pin through the center hole tovvard the top of the ſtreight line on the board, and put another pin tovvards the bottom of the line, vvhich is your 12 a clock line, (theſe tvvo pins keepeth yovr paper ſteady;) then vvith a ſmall bodkin pricke a hole through every houre-line of your paper into the board, and then take it off; then ſtick in your pin into the center hole of the board again, and laying the ruler cloſe to the pin, and cloſe to each hole in the board, mark & dravv your hour-lines; (and note that you may extend theſe hour-lines to vvhat length you pleaſe, according to the bigneſs of the board;) and then figure it as you ſee in this example following.



Nevv for the cocke or ſtile of your Diall, it muſt be ſet in the 12 houre line, & muſt be juſt equall in height from the boord, as the triangular Figure marked with B ſheweth; the line with pricks is but to direct you which ſide muſt be next to the boord: The Stile may be made of a thin iron plate, and Cement in, or of a ſtiffe wire; the upper end of which muſt be put juſt to the center by A, equal to the 6 hour line when this is done, you muſt get ſome Painter to paint it in oyle colours, and ſo ſet it up.

RE-

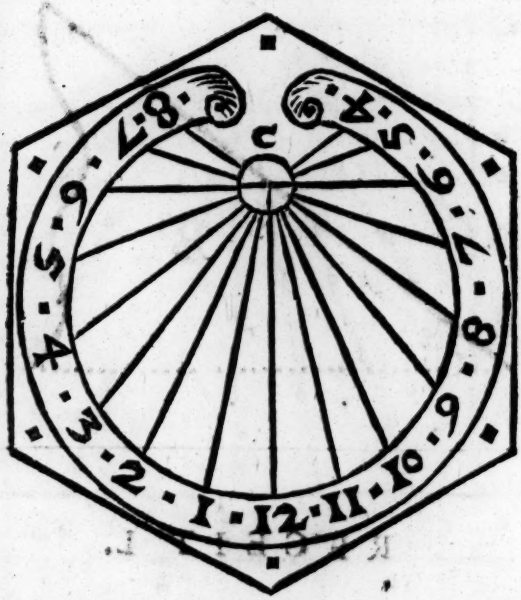


RECEIT L.

How to make a Horizontal or Flat Diall, to ſtand upon a Poſt, or other place.

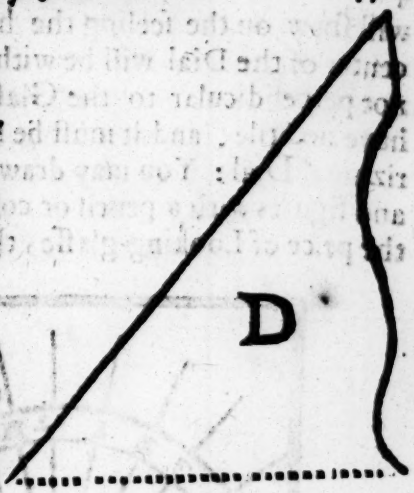
THis Diall may be made into ſundry formes, either foure ſquare, ſix, or eight ſquare, or round as you pleaſe, and it is to be placed on the head of a Poſt, either in Garden, Yard, or at the out-ſide of a Glaſſe-window where the Sun cometh: behold the forme.

You



You must note, that the hour-lines of this Diall doth vary from the former, and so doth the Stile in height: But you must work with this as in the other with your oyled paper, to draw the hour-lines, and so make a line just in the middle; for your 12 a clock line. The center of this Diall is hard by the letter C, and must be more neere the middle then the other, because it containeth more hours thereon, for the other will serve but from 6 to 6, but this from 4 to 8. You may make this Diall in Stone, Wood, or Mettal, and remember to make the height of this Stile or Cock according to this triangle marked with the letter D, for it must be higher, as you may perceive by this

This Figure. You may make Simmon for to faſten the ſtile, vvith Rozen, powder of brick, and ſome chalk, mingled together, and with a hot Iron melt it into the cerviſe.



Note, That theſe Dials will not ſerve in any part of England, but within 10 *or* 20 *miles of* London.

RECEIT LI.

A prety way to make a Sun-Dial on the ſeeling of a room, or chamber, whereby you may know the time of the day, as you lye in bed.

IF you have any window South-Eaſt, or South, which is beſt, and that is for your turne, in the lower poſt, or frame of the in-ſide of your window, about the middle, faſten with wax a little round piece of Looking-glaſſe, or other glaſſe, about the bigneſs of a two-pence, (you may cut it round with an old paire of Sizers;) but if you place it higher in your window on a ledge, it will be the better, (as you may ſee here in the Figure,) ſetting it level with the Horizon; and the reflection of the Sun in the Glaſſe will

will shew on the seeling the hour of the day, the center of the Dial will be without the window and not perpendicular to the Glasse. This Diall must have no Stile, and it must be made like the last Horizontal Dial: You may draw the circle, hour-lines, and figures with a pencil or coale, the black spot is the peice of Looking-glasse, the Diall is the seeling.

RECEIT LII.

How to make a Candle-Diall, whereby you may know the houres of the night.

ONe Winters evening sitting by the fire, me thought there might be some device for a Candle-Dial; At length it came into my head, I made a little

little four ſquare frame of wood, of a piece of a thin Trencher, making the in-ſide thereof fit for the bottome of a Candle-ſtick to ſtand in, which I did ordinarily uſe, on two ſides of the ſquare I faſtened a little piece of Wyre, not a quarter of an inch long, and juſt were the Candle-ſtick ſhould ſtand, on a Table or Boord, I made two little holes with a Bodkin for the ends of the two Wyres to goe into, and then I ſet down my Candle and Candle-ſtick into the ſquare: Having thus done, I made another long Frame like the frame of a Picture, and paſted halfe a ſheet of white paper therein upon a thin boord, and ſo hang it up againſt the wall; Then in the Seeing I faſtened a ſmall Pulley, and on that Pulley I had two little plummets of lead, one broader at the bottom then the other, & tied them to a piece of Packthread at each end, and ſo hung them in a Pulley, (as you may better apprehend by the figure,) the broadeſt Plummet I pulled down till it gave a ſhadow on the lower end of the paper in

the frame on the wall, (which is now the 1 and 7, a clock line) and where the broad bottome caſt a ſhadow I made a ſpeck with my pen, and then turned an houre-glaſſe, and when that was run out, I made another ſpecke, which is the 2 an 8 line, and ſo of the reſt, by theſe diviſions, you may with a pair of compaſſes divide the reſt of the houre lines upwards, you muſt pull down the broad Plummet and ſet it at any time to houre you pleaſe, as by this, it ſhews that it is halfe an houre paſt 4 or 10 of the clock. You muſt remember to have your candles always of one ſize or weight, as of the eights, or twelves in the pound, or ſuch as you uſually burne. You may take away your Candle and candle-ſtick out of the ſquare frame if you have occaſion and then ſet it downe in its place again, which keeps all right. I have placed the Figures at each end of the hour-lines, as from 1 to 7 on the firſt ſide, and then from 7 to 12 on the other ſide. Note, when it is juſt 7 on the firſt ſide, then pull down the Plummet to 7 on the other ſide, which I hold to be the beſt way.

RECEIT LIII.

How to keep Cherries, Peares, Nuts, or other Fruit a yeare, as freſh as they came from the Tree.

WHen they are prety ripe, cut off the ſtalks, & put them into an earthen pot well leaded, & then cover them well with Honey, then ſtop the pot

pot with Pitch, or Wax, that no ayre may enter in, and then put the pot in ſome Sellar, or coole place, burying it well in Sand, and ſo let it remaine till you uſe it.

RECEIT LIV.

How to make Grapes, and other Fruit to have no ſtone or kernels.

IT is ſaid, that if ye do plant or ſet the ſmaller end of the twig of a vine ſome-what deep into the earth (which will take root) that thoſe Grapes that will grow thereon ſhall have no ſtones, the like effect hath Peaches, Apricoks, Damſons, and other Stone-fruits, if the ſmall ends of the cyons be grafted into the ſtocks. Alſo, if you bend downe both the end of apple or peare-tree cyon, and graft them on both ſides of the ſtock; and the next yeare when they have grown, cut the cyon in the middle, and one ſhall beare fruit with kernels, and the other none.

RECEIT LV.

How to make yellow Roſes grow, and to make Trees and other things grow green all the yeare.

I Have been informed, that if you will graft a white Roſe upon a Broom-ſtalke, or on a Furzon buſh, that the ſame will bear yellow Roſes, but they will have no ſweet ſent.

Alſo, if you will graft a Roſe, or other thing upon a Holy-ſtock, the leaves of the ſame will grow green all the yeare.

RECEIT LVI.

How to make Apples, Peares, and other Fruit of ſeveral colours, and to give them a dainty taſte of Spices.

IF you will give a pleaſant colour to your Fruit, do thus; For a red, boyle Braſil, Turne-ſoyle, or Sanders, and for a yellow, uſe Saffron, or Turmericke: Now to give them a dainty taſte and ſmell, you muſt beat Cloves, Mace, Cinamon, & Nutmegs, to powder, and mixe them with the water of your colours with ſome honey; then with an auger bore a hole in the biggeſt part of the tree, unto the middle, ſomething ſloping down-wards, and then poure your water and ſpices into the hole, then with a pin made of the ſame Wood, or tree, beat it hard into the hole, and ſaw off the end, and wax it about: This muſt be done in Winter before the Spring, becauſe when the ſap riſeth, the colour, ſcent, and taſte alſo, aſcendeth with the ſame.

RECEIT LVII.

How to know preciſely on the Seeling of a Chamber, which way the wind blowes at all times.

THis conceit did I ſee in King *James* his Bed-chamber at White-hal, the Chamber was an upper roome, having a Vane, or Weather-cock of Iron

Iron placed about tht top, or tyles of the houſe which had a long ſtem of Iron, which did reach from thence through the Seeling of the Chamber, upon which Seeling was pointed a Mariners compaſſe, with the two & thirty winds thereon, now the lower end of the ſtem of the vane came through the center of the compaſſe, unto which was faſtened an index or needle (like to thoſe in a ordinary Dial) which doth preſently ſhew hovv the various vvind doth ſhift from place to place, vvhich you may continually knovv preciſely, both night and day.

RECEIT IX.

How to keep drink quick and freſh, that beginneth to be ſower and dead.

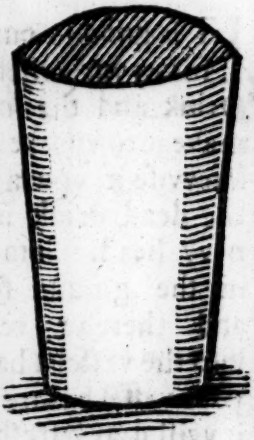
IT is good io put a handful or tvvo of ground malt into your veſſel (if it begin to faile) and ſtir the Drink and the malt vvell together, and this vvill make it to vvorke a freſh, and become good again, likevviſe if you adde nevv ſtrong drink to the old, the dead drink is forced for to vvork again to a nevv head. Some do bury their veſſel of drink in the ground for foure and tvventy houres, and thereby recover it. Others doe throvv into the veſſel a handful of Salt, it is alſo good to tilt your veſſel before your drink be halfe out, and then it vvill dravv freſh to the latter end. But the beſt vvay is to put a handful, or more, of Oat-meale into your veſſel, vvhen it is firſt laid into the Seller, or

Buttery, vvhereby it vvill alvvays carry a quicke and lively taſte.

RECEIT LIX.

An excellent way for baking of Bread, that it ſhall not be hard cruſted, nor yeeld ſo many crums.

GOe to the Plate-worker, (ſuch as maketh ordinary Dripping-pans) and cauſe him to make Pot, or Pots of his Latten-plate, which may containe half a peck, or greater, or leſſe, as you pleaſe, according as you meane the bigneſs of your Loaf ſhall be; let this pot be made with a bottome at the lower end, and open at the top, almoſt like a beaker, as you me ſee here by this Figure, and when it is done, take a little Butter, and annoint the in-ſide of the pot there-with, and when your Dow is moulded put it into the ſame, (not ful to the top) and thruſt it down hard to the bottome, & then ſet it into an Oven amongſt other bread, with the leſſer end down-ward, and when it is baked it will eaſily come out, this Loaf will have no hard cruſt, nor crume as other Loaves doe and will ſhew ſmooth, ſtanding like a Sugar-loaf upon the Table, and in a little compaſſe.



RE-

RECEIT LX.

A dainty, ſtrong, ad gliſtering Mortar, or Plaiſtring for Seelings, or for Wals.

IT is ſaid that in *Italy* they much uſe this Conceit for Plaiſtering of their Seelings, Floors, or Wals, which is by mixing and well tempering together Oxen and Cows bloud with fine Loam or Clay, and it will be a very ſtrong and binding ſubſtance, and being well ſmoothed it will gliſter, and become very hard.

Some few (but choice) Phyſical Receits, &c.

RECEIT LXI.

Of the great vertues of Crocum Martis, *fit to be uſed at this time for the Bloudy-flux, which ſo much now reigneth in the Army.*

THis *Crocum Martis* is a powder which you may have at the Apothecaries; this amongſt all other Medicines in the world, is the moſt excellent that can be found againſt the Bloudy-flux giving it in this order. Take an ounce of conſerve of Roſes, and one ſcruple of *Crocum Martis*, and mixe them together, then let the Patient eat it in the morning, and faſt thereon two houres, and this (by the Grace of God) will helpe him, although he had it never ſo long, or never ſo ſore. It is alſo given above all other medicines, in the latter end of a Dropſie; and alſo againſt the Flux of Menſtrues, & againſt bleeding at the Noſe, & all other Fluxes whatſoever; it helpeth thoſe that ſpit bloud, it is excellent to ſtop the Flux in wounds, & to heale them, and dry them, if yet ſtrew the powder thereon.

RE-

RECEIT LXII.

Of the rare vertue and operation of the Quinteſſence of Honey, for many diſeaſes, with the oile of Wax.

YOu muſt underſtand, that Honey is rather a liquour Divine, then Humane, becauſe it falleth from Heaven, upon Hearbs and Flowers, and is ſuch a ſweet thing, that the like cannot be found upon the earth; this Quinteſſence is of ſuch vertue, that if any be almoſt dead, and drink two or three Drams thereof, he will preſently recover. If you waſh any wound therewith, or other ſore, it will quickly heale. It is excellent againſt the Cough, Catar, or paine of the Milt, and many other Diſeaſes, it helpeth the Falling-ſickneſſe, the Palſie, and preſerveth the body from putrefaction.

The oyle of Wax worketh in wounds moſt miraculouſly, healing them, be the ſame never ſo big and wide, (being before wide ſtitched up,) in the ſpace of eleven or twelve dayes: but ſmaller wounds in three or foure dayes, by anoynting the ſame therewith, and laying a cloath thereon wet in the ſame. Moreover, for inward Diſeaſes it is excellent; It provoketh Urine which is ſtopped, it helpeth ſtitches, and paine in the loynes, if you drinke one dram thereof in white Wine, it helpeth the cold Gout, or Sciatica, and all other griefs coming of cold.

RE-

RECEIT LXIII.

Of the manifold operations of the Oile or Cinamon.

THis Oyle is of a miraculous nature, for it pierceth through the fleſh and bones, being very hot and dry, and is good againſt all cold and moiſt diſeaſes, being comfortable for the head and heart, working the ſame operation on a dying man as the former. To be ſhort, this Oile is of ſuch operation and vertue, that if a man drink never ſo little, he ſhall feele it work to his fingers and toes ends, therefore it pierceth through the wholy body, helping all Diſeaſes that come of cold and flegmatick humours, it availeth much with Women in travell, it driveth away the Meaſels and ſpots, if the face and hands be anoynted there-with, it warmeth the breaſt, and helps the cold Cough, it conſummes all cold Fluxes that proceed from braine and head, & cauſeth quiet ſleep. In briefe, this Oyle may be uſed inſtead of the natural Balme for many diſeaſes.

RECEIT LXIV.

How to Diſtill, and make oyle of Roſemary Flowers, with its vertue.

TAke Roſemary flowers and ſtampe them, then put them into a glaſſe with ſtrong wine, and ſtop it cloſe, ſetting it in the Sun for five or ſix dayes, and

and then diſtil it with a ſoft fire, and you ſhall have both water and oile, which you muſt ſeparate, keeping the oyle cloſe in the Glaſſe, whoſe vertues are theſe.

It helpeth againſt all paines in the Head, although they have continued ſeven yeares, it comfortth the memory, and alſo preſerveth the eyes, if you drinke now and then a drop or two, and put another into the eyes, it helpeth thoſe that are deaf, if it be put into the ears, and alſo drunk with good wine, it openeth all ſtoppings of the Liver and Milt, and helpeth againſt the Dropſie, and yellow Janudiſe, it breaketh wind eaſeth Cholick, and riſing of the mother, it is alſo excellent againſt the Peſtilence, or thoſe which have drunk poyſon, if they drinke of this Oile, and lay them down to ſweat: It comforteth the heart, and cleanſeth the blood, and maketh a man merry, and cauſeth a good colour: It helpeth thoſe that have Canker and Fiſtula, and ſuch like. And to be briefe, it helpeth all the diſeaſes of the body that come of cold and moyſt humours, although they were never ſo evil.

RECEIT XLV.

How to help Deafneſſe, and to expell wind from the Head.

TAke five or ſix drops, or more, of the Spirit of Wine, or good Aqua-vitæ in a ſpoone, and holding downe your head on one ſide, let one poure the

the ſame into your eare, let it continue there about the ſpace of halfe a quarter of an houre, ſtill holding your head aſide that it run not out, and then you ſhall here a moſt terrible noyſe and rumbling in your head, which is the wind, then turn your head aſide, & the water will run all out againe very hot; Now when you have done thus much on one ſide, you may doe as much on the other, but be ſure to keep your head warme after you have done. This I have often proved, and found eaſe thereby.

RECEIT LXVI.

How to give eaſe, and helpe the raging paine of the teeth with drawing.

THis is alſo performed with the ſpirit of Wine, or good Aqua-vitæ (as you have read in the former Receit) by pouring it into the eares, eſpecially on that ſide where your paine lieth: but after that you have let the water run forth of your eares, then with more of the ſame water (againſt the fire) you muſt rub and chafe your cheeks, and under your jaws, and behind your ears, ſtroking of them upvvards with your hands tovvard the neck, to drive back the humours: for it is nothing elſe but a cold rheume that diſtilleth from the head into the gums which cauſeth the paine: therefore be ſure to keep the head very vvarme vvhen you have done.

I have

I have been certified (but how true it is I know not) that three teeth taken out of a dead mans skull, and ſowed in a clout, or piece of leather, and worne about them, which were much ſubject to the Tooth-ach, it gave them preſent eaſe, and they never were troubled with the ſame ſo long as they had thoſe about them.

RECEIT LXVII.

A dainty Receit for curious Artiſts, or others, to ſtrengthen and comfort the eyes.

THis Receit I had of a curious Ingraver, and my Friend, who every morning before he went to worke, in the corner of his Hand-kercher, (or a clean linnen rag) did put a few drops of Aqua-vitæ, and with the ſame did wipe the corners of his eyes, eye-browes, and temples, which did keepe backe the Rheume, and greatly did ſtrengthen and comfort the eyes; of which I have often made triall, and found much comfort.

RECEIT LXVIII.

Of Fractures, which are bones broken, and alſo of Diſlocations, or joynts diſplaced, with their cure.

MAny times it happeneth that Leggs, Armes, & Fingers are broken, or out of joynt, and the Party ſo hurt is voyd of help, by reaſon they have no Chirurgion neare them, therefore for the relief of ſuch

ſuch perſons, I have here ſet down ſome directions, by which they may be eaſed of their paine: But I would not wiſh them to truſt to too much of their owne skill, if they have any expert Chirurgion neare hand to doe it.

If a Legge, or an Arme be broken, then have a care to place the member in the ſame manner as it was before, which you ſhall doe in this manner.

Take a tovvel, and make it faſt above the place where it is broken, and then take another tovvel and faſten it underneath the place where it is broken, then cauſe two men to pull thoſe tvvo tovvels, that they may thereby extend, or ſtretch out the member, and vvhen the member is ſtretched forth at length, place the broken bones as they were at the firſt, and ſo by little and little let them ſlack their pulling, then have a cloath ready, ſo big that it may compaſſe the whole member, wet this cloth in white of Eggs, and Oile of Roſes mingled together, and lay it on the grieved part, then roule it about with a linnen Rouler of foure fingers broad, and two yards long, vvet the rouler in water, and vinegar mingled together.

Firſt, roule it about the fracture three or four times, then down-vvard, and then up-vvard, and ſo faſten it, then roule it vvith another rouler, in the ſame manner, on theſe place thin ſplints of light wood armed vvell vvith tovv, one fingers breadth from each other, and bind them on vvith tape, then place the member on ſome ſoft Pillow for tvventy dayes: but if a pain-ful itch doe ariſe, open and foment the place vvith vvarme vvater, and then annoint it vvith *Unguentum album*, and roule it up again.

If

If that a finger be broken, roule it vvith a convenient rouler, and ſplint it, and uſe the meanes aforeſaid.

RECEIT LXIX.

A precious Salve for all thoſe that have had any member out of joynt called Jeremy *of* Brunſvvicks Salve.

THis famous Chirurgion, vvith this Salve, hath healed thoſe that had formerly their members out of joynt, or thoſe that had been vvounded, and could not ſtirre or bovv the member vvhere they had the hurt; for by this Salve did he bring many ſtiffe and crooked joynts againe to their former ſtrength, to the great admiration of all men, both Chirurgions and others.

How to make the Salve.

Take two ounces of old Hogſ-greaſe, & of Ducks-greaſe, and Gooſe-greaſe, Hens or Capons-greaſe, of each two ounces: Linſeed-meale, Fenegreek-meale, of each two ounces, Oile-olive eight ounces; Oppoponax, Maſtick, and Frankincenſe, of each an ounce: diſſolve the Gums in white wine (that are to be diſſolved) and powder the other, mingle them all together, and adde wax and turpentine to them, then boyle them all together with good ſtirring.

RE-

RECEIT LXX.

How to order and dreſſe a wound, when it is firſt hurt, with their remedy.

FIrſt, remove all ſuch things as are in the wound, as clotted bloud, vvood, iron, or the like; then dry the bloud with a cloath or ſpunge, and waſh it with cold white wine, and apply ſome unguents or Balmes to the ſame, and on that a plaiſter fit for a wound, then roule it gently, and in good forme, for that helpeth to haſten the cure.

If the wound be of any length, you may ſtitch it in three or more places, but be ſure for to leave a place at the lovver part thereof, for to purge it ſelfe thereby.

RECEIT LXXI.

An excellent Vnguent, or Liniment for greene Wounds, eſpecially for thoſe in the head.

TAke of the beſt Turpentine an ounce and a halfe and as much of Gum Elemi, of Capons-greaſe an ounce, melt theſe at the fite, and mingle them. When you uſe it, melt it, and annoynt the edges of the vvound, and dip a pledge of lint in it, and then lay a plaiſter on the top of the ſame, and roule it gently.

RE-

RECEIT LXXII.

How to make a ſoveraigne Oile, or Balme for all wounds ſimple, or confuſed.

TAke three pound of common Oile, two pound of Turpentine, wheat that is cleanſed five ounces, Saint *Johns* wort a pound, Valerian, Cardus Benedictus, of each fourteen ounces; bruiſe the Hearbs, and infuſe them in white wine ſix or eight houres, then put thereto the Wheat and Oile, and boyle them on an eaſie fire, till the wine be conſumed: then ſtraine them, and put the Turpentine in, and then boyle them again on a ſoft fire to perfection.

RECEIT LXXIII.

An exeellent Emplaiſter, which is good for all wounds or Vlcers.

TAke Deers ſuet foure ounces, Roſin, and Petroſin, of each a pound and a halfe, white wax, and Frankincenſe, of each foure ounces, Maſtick an ounce; melt the wax and ſuet, and powder the gums, and put them together, and when they be melted, ſtraine them through a piece of Canvaſſe, then adde to them a pottle of white wine, and boyl them all to the conſumption of the wine, with continual ſtirring, and then take it from the fire, and when it is almoſt

cold, put thereto foure ounces of turpentine waſhed in white wine, & of camphier powdered two ounces; then make roules of it, and keep it for your uſe.

RECEIT LXXIV.

Another excellent Plaiſter for Wounds in the Breſt, or other parts.

TAke Roſin that is freſh, cleare, & ſweet, a pound, Oile of Bayes, and turpentine, of each two ounces; Gum Elemni ſweet and good foure ounces; melt the Roſin and Gum together, and ſtirre them well, then put in the Oile and turpentine, and let it boyle, with continual ſtirring, and then ſtraine it, & reſerve it for your uſe in a cloſe pot.

When you uſe it, ſpread it on a piece of leather, bigger then the wound by three fingers breadth, and make a hole in the middle of the leather for the corruption to run forth, this doth it without tent or pledget: dreſſe it twice a day in the Summer, and once a day in the winter.

This plaiſter is good for all wounds in the breaſt, or other parts, for it draweth the hollow parts of all wounds, and ſtrengtheneth the parts, clearing them from un-natural matter, and dryeth all wounds cauſed by thruſts.

RE-

RECEIT LXXV.

Of the general ſignifications of ſickneſſes, either preſent, or neere at hand.

THeſe following Preſages & tokens of ſickneſſes, are worth the obſervation of all men; Firſt, to prepare themſelves for God, if he be pleaſed to call them; otherwiſe that they may in time, before they may be too much ſpent, have the conſell and helpe of learned and expert Phyſicians.

Signes of Sickneſſe are theſe.

If the body be hotter, colder, moyſter, dryer, leaner, or fatter, or the colour more pale, or more ſwartiſh, or the eyes more hollow then they were accuſtomed to be, and on the ſudden change, all theſe are certain fore-runners and meſſengers, that the body is diſpoſed to ſickneſſe, or already ſick.

RECEIT LXXVI.

Of the ſignification of the ſeveral colours of ſome Urines.

THe Colours and Sumptoms of urines are many and various, as are the Diſeaſes, and therefore ought to be judged on by the learned: but thus much it briefe.

Red and thick urine, betokeneth ſanguine.
Red and thin, betokeneth melancholy.
White and thick, ſignifieth flegme.

White and thin, betokeneth melancholly.

The highneſs of the colour ſignifieth heat, but the pale, black, or green, betokeneth cold.

Alſo, the groſneſs, or thickneſs of the urine ſignifieth moyſture, the clearneſs, or thinneſs, dryneſs.

Urine of the colour of bright Gold, or of the colour of Gilt, ſignifieth perfect digeſtion, or health.

Red as a red Apple, or Cherry, or baſe red like bole Armoniack, or red like glowing fire, betokeneth exceſſe of digeſtion.

Cleare and white like water, or gray as a horne, or white like whey, or the colour of a Camels haire, ſignifieth lack of digeſtion.

Pale, like to broth, or fleſh ſodden, betokeneth the beginning of digeſtion.

Citrine colour, or yellow, or ſub-citrine, or paler, ſignifieth the middle of digeſtion.

Colour of a Beaſts liver, or of darke wine, or green like to Cole-worts, ſheweth aduſtion of humours.

Urine of a leady colour, or black as inke, or black as horne, or darke above, and clere beneath, betokeneth feebleneſſe of nature, mortification, and death.

The

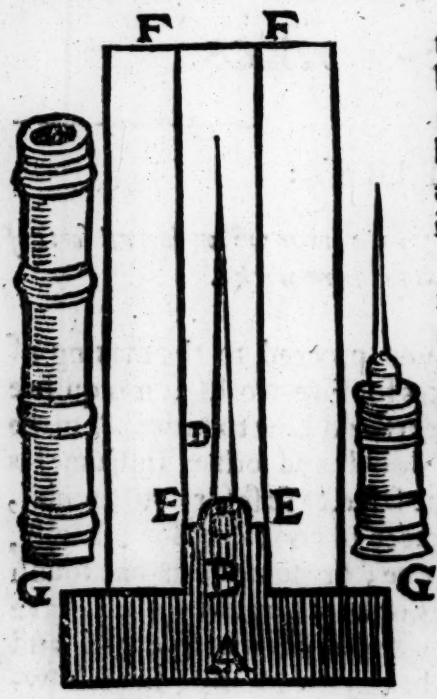
The Schoole of Artificial Fire-workes.

FIRST:

The order and making in a true proportion all sorts of Moulds for Fire-works.

BEfore you proceed to the making of Rockes for Fire-works, it is requisite to understand how to order, & make your Moulds and other Instruments for the same, & first for your moulds, You must provide a piece of good dry Box, Holly, Walnut-tree, Crab-tree, or some such like tough wood, with out shakes or knots, and when you have thus done it is fit to know of what length and breadth you desire to have your Mould, for following this kinde of proportion, all other sorts of moulds are made great and small, therefore you ought to have a Turner to turn and bore the same: as for example: If I would have the hole of a Mould bored but an inch diameter, or wide, then the length of the mould must be six times so long as the hole is wide (which is six inches) and on each side of the hole half an inch thick: So that when the Mould is

turned round, it is two inches over in breadth. When you have done this, you must have a bottom made, and is to be fitted in this manner, as is described by the letters in Figure following.



A. Is the foot of the Mould, & must be in height two inches, and must be in breadth an inch and a quarter, whether it be square or round.

B. Serveth only for a stay, and must arise one inch into the Mould, and so proportional in all other moulds.

C. Is for the mouth of the Rocket, and is in breadth two third parts of an inch, & then setting one foot of a paire of Compasses in the middle or center, describe the arch, which is the full height required.

D. Is the length and bigness of the Needle, which is two third parts the length of the mould, and the bigness of the bottome one sixth part the breadth of the bore, and taper toward the top.

F. E. Serveth for the Paper being rouled, and must be one sixth part of the breadth on each side.

F. F. Is

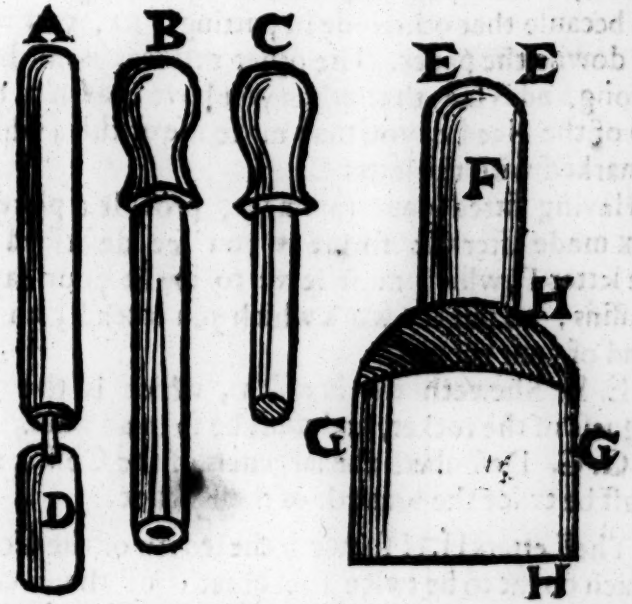
F.F. Is the thicneſs of the mould, which is halfe the breadth of the bore, that is in this mould halfe an inch.

F.G. Is the length of the mould, which is ſix times the breadth.

---

2 *The order and making of Rowlers, Rammers, and other things for the Coffins.*

HAving provided your mould, then you are to fit your Rowler, which muſt be two third parts of the breadth of the bore of the mould, and the length thereof ſix inches lnoger then the mould, which is for rouling of your paper, and is deſcribed by the letter A in the figure following, with a hole to be



bored in the bottom to receive a Wyre, which muſt

be faſtened in another piece of wood ſome-what ſhorter, to take out at your pleaſure, which is deſcribed by the letter D, the uſe thereof ſhall be deſcribed, when I ſhall ſhew the order of making the Coffins.

When you have fitted your rocket, then proceed to the making of your rammers, which muſt always be two at the leaſt, for each ſeveral mould as they increaſe in largeneſs, ſo you muſt be fitted with ſeveral rammers, by reaſon of the Taper Needle: the manner and forme is deſcribed by the letters B, C, in the Figure following.

B. Is the hollow rammer, and hath a hole in it anſwerable to the length and bigneſs of the Taper Needle, it muſt be a ſmall matter leſſe then the rowler, becauſe that otherwiſe in putting it in, you will put downe the paper. The other rammer is not half ſo long, and is ſad, that when you have beaten to the top of the Needle, you may make uſe of this, which is marked with the letter C.

Having fitted your rammers, provide a piece of Box made after the forme as you ſee deſcribed by the letter F, which muſt ſerve to make your large Coffins, to put the work which you intend, on the head of your rockets.

E. E. Sheweth the breadth, which is the juſt bigneſs of the rocket, and muſt be ſo in all ſizes.

G. G. Deſcribeth the largeneſs of the Coffin, and muſt be twice the breadth of the Rocket.

The Letters H. H ſheweth the length of the Coffin which ought to be twice the breath of the rocket, but you are not tyed to that ſo preciſely, becauſe you

you may alter that according to the work which you put therein.

---

3 *How to order, and make the Coffins of Paper.*

HAving explained the manner and forme of the moulds, with the other things belonging to the ſame; I will now ſhew the uſe of them in their ſeveral orders: and firſt, for the uſe of the Rowler, deſcribed by the letter A, in the Figure before.

Provide you ſome good large ſtrong Paper for your work: and to know what length your Paper muſt be, let it be always the length of your mould, ſo ſhall you have one breadth left above the mould, the uſe whereof ſhall be ſhewed hereafter. Now having provided your Paper in length ready, take your rowler, and one length of Paper, and begin to roule; when you have rovled one ſheet, you muſt have a board with a handle, to roule it with, (the board is marked in the Figure following with the letter B,) which muſt be done in this manner: You muſt hold the rowler in your left hand, and with your right hand hold the board by the handle, and then lay down your rowler upon ſome ſmooth cheſt, or table, which when you have done, roule another length of Paper, & ſo proceed in rouling between every ſheet, untill you have rouled on ſo much, as will fill the mould very ſtreight. When you have thus done, draw forth the rowler about an inch, and then take the other ſhort rowler, which is marked with the letter D, in the other Figure, and put it in as you

ſee

ſee deſcribed, and there you ſhall have a place left for the choaking of the rocket, of which is next following.

4 *The order and manner how you ſhall choake a rocket.*

WHen you are to choak a rocket, you muſt have an iron hooke, or a ſtaple driven into ſome poſt, to which you muſt faſten your cord, which muſt be bigger or leſs, according to the bigneſs of your rocket, by reaſon that a ſmall cord will not choake a great rocket for vvant of ſtrength, and a great cord will not ſerve for a ſmall one, in regard that it will make too great a choaking, ſo that you muſt have a bigger and a leſſe; and when you have ſo done, you muſt tye one end of the cord to the hooke or ſtaple, and at the other end, about a yard off, tye a ſtrong ſtick, in faſhion of a ſwing, it muſt be

be ſtrong, becauſe it beareth the weight of the body, (as you may ſee in the Figure following, marked with the letter K) which when you have provided, put the ſtick between your legges, and wind the cord about the rocket-caſe in the place appointed, which muſt be between the long rowler and the ſhort, when that is done, girt it by degrees, ever turning the rowler to the end it may come together more cloſe and neat, and when you have ſufficiently choaked it, draw forth your ſhort rowler, & vvhere the choaking is, tye it about with ſtrong Pack-thread, and then dravv forth the rovvler, your Coffin is ready to be filled when occaſion ſerveth, the form vvhereof follovveth, by this letter A.

5 *The manner of driving a Rocket, with the inſtruments belonging thereto.*

YOur Coffin of Paper being finiſhed, take it, and with your hollow Rammer, force the ſame downe cloſe into the mould, and when you have done, ſtrike two or three hard blowes to ſettle the Paper into his right forme: Which being done, then you muſt fill the Coffin, in doing whereof, you muſt have a care, providing a meaſure, which may containe but the twentieth part of your whole Rocket; ſo by that meanes you ſhall not faile, but every Rocket ſhall have a true proportion alike: as for example; I have a Coffin, which being filled, will hold an ounce of mixture, or thereabouts: then I take the twentieth part, and when I find what quantity it is, I make a meaſnre of horne or Lattin marked with the Letter F, which ſhall containe ſo much, and then I begin to fill my Coffin with one meaſure at a time, and putting in my Rammer, I ſtrike foure or five ſmart blowes with a good heavie mallet, and then I fill another meaſure, and ſtrike again, ſo I continue till I come to the top of the Needle, then I take the ſad Rammer, and ſo continue with it, till I come to the top of the mould, now the paper which is above the top of the mould, muſt be turned downe, and beaten hard: which being done, the rocket is finiſhed from the mould, which being forced out with as much eaſe as you can, for the leſſe you force it, (being filled, and the Needle taken out,) the better it is for knocking looſens the Powder, and ſo cauſes the Rocket for to faile. You ſhould have a Funnel to fill your ſmall Rockets, which is marked with the latter G.

6 *Of*

6 *Of the Compoſition and Receits for your Rockets.*

HAving thus finiſhed your Rockets, it now reſts to know the Receits : For in the making of them, the chiefeſt thing to be regarded is,the compoſition that they ought to be filled withal:for as much as that which is proper to Rockets which are of a leſſe ſort, is very improper to thoſe which are of a greater ſize: for the Fire being lighted in a great Concave, which is filled with a quick compoſition; burnes with great violence: and ſo contrary,a weake compoſition being placed into a ſmall Concave, maketh no effect: Therefore we ſhall here deliver Rules and directions,which may ſerve for the true compoſition, or matter where-whith you may charge any Rocket; from Rockets which are charged but vvith one ounce of powder, unto greater, which requireth for their charge ten pound of powder : And here followeth the ingrediences for ſeveral Rockets.

Firſt,

First, for Rockets of one ounce.

Unto each pound of good musket powder beaten, put two ounces of ſmall Cole duſt, and with this charge the Rocket.

For Rockets of two or three ounces.

Unto every foure ounces and a halfe of powder-duſt add an ounce of Salt-peter, or to every four ounces of powder-duſt; add an ounce of Coal-duſt.

For Rockets of four ounces.

Unto every pound of Powder-duſt add four ounces of Salt-peter, and an ounce of Coal-duſt, but to have it more ſlow, unto every ten ounces of good powder-duſt, add three ounces of Salt-peter, and three ounces of Coal-duſt.

For Rockets of five or ſix ounces.

Unto every pound of Powder-duſt, add three ounces and a half of Salt-peter, and two ounces and a half of Coal-duſt, and an ounce of Sulphur, and an ounce of File-duſt.

For Rockets of ſeven or eight ounces.

Unto every pound of Powder-duſt, add four ounces of Salt-peter, and three ounces of Sulphur.

For Rockets of ten or twelve ounces.

Unto the former Ingredients, add half an ounce of Sulphur, and it will be ſufficient.

For Rockets of fourteen, and ſixteen ounces.

Unto every pound of powder-duſt, add four ounces of Salt-peter, of Coal-duſt, two ounces and a quarter, of Sulphur and File-duſt; an ounce and a quarter.

For Rockets of one pound.

Unto every pound of Powder-duſt, add three ounces of Coal-duſt, and an ounce of Sulphur.

For

For Rockets of two pound.

Unto every pound of Powder-duſt, add nine ounces and a half of Salt-peter, of Coal-duſt, two ounces and a halfe, of File-duſt, one ounce and a half, and of Sulphur, three quarters of an ounce.

For Rockets of three pound.

Unto every pound of Salt-peter, add ſix ounces of Coal-duſt, and of Sulphur foure ounces.

For Rockets of foure, five, ſix, or ſeven pound.

Unto each pound of Salt-peter, add five ounces of Coal-duſt, and of Sulphur two ounces and a halfe.

For Rockets of eight, nine, or ten pound.

Unto every pound of Salt-peter, add five ounces & a halfe of Coal-duſt, and of Sulphur two ounces and a half.

Here note, that in all great Rockets there is no powder put, becauſe of the greatneſs of the Fire, which is lighted at once, which cauſeth too great a violence, and therefore ought to be filled with a more weake compoſition.

Now when you have provided your Powder, you muſt firſt meale it, and then ſearce it, ſo that it may be free from any corne, though never ſo ſmall. Likewiſe take good dry coale, well burnt, and beat it to duſt, ſearcing it very fine, which when you have done, mixe them according as your occaſion requireth, and following your directions.

7 *The manner of heading a Rocket, with the order of capping it.*

IN the manner of heading a Rocket, you muſt uſe the thick Rowler, which you may ſee deſcribed by the letter F, in the ſecond figure: upon which you muſt roule ſome paper, or fine Paſt-board, and paſt it ſo that it may be very cloſe, and then choake it at the length of the thicker part, ſo that it may come cloſe to your ſticke in the leſſer part, which will be fit to be tyed to the top of the Rocket: ſo ſhall you have a Coffin to put in your workes, which muſt be of divers ſorts. This being done, you muſt provide taper Caps, which muſt be adioyned to the top of the large Coffin: The uſe of them is to keep in your workes, and to cauſe them to pierce the Ayre more ſwifter. The manner of making theſe Caps, is to take a paire of Compaſſes, & deſcribe a circle in Paſt-board; then cut it out with a paire of Sheeres, and that will make two caps, being cut in the middle, and turned one corner under the other, and ſo paſted: and let them ſo paſted, be put in a Napkin-preſs till they be dry, and when they are dry, cut out a halfe circle in Paper, which ſhall fit round about the ſaid cap, and ſhall ſerve to paſt on the cap to the coffin; So you have all things ready to the finiſhing of your Rocket, which muſt be done in the manner which followeth. R. in the next Figure; is the crackers faſtned to the top of the Rocket: S, is the cap, T, is the Fiſgigs finiſhed, H, is the ſtick tyed to the Rocket.

8 *The*

8 *The manner of finiſhing a Rocket.*

HAving driven your Rocket, as I have ſhewed, with the Paper turned down, you muſt firſt prime it, which muſt be with Cotten-wick made for that purpoſe, which you muſt put into the vent, leaving a piece to hang lower then the mouth of the Rocket by three or four inches; which being done, tye a piece of Paper over the mouth, that it may not fall out. Now having primed your Rocket, you may proceed to the heading of it, and that is done after this manner.

Take your Rocket, and on the head you ſhould turne down the Paper, you muſt with a Bodkin pierce two or three holes, that when the Rocket hath ſpent it ſelfe, the works which are in the head may take fire; which holes prime with a little Powder-duſt, and then put on the head, with the choaking fitted to your Rocket, which muſt come over the ſame in ſuch manner, that the bottome of the greater part muſt come even with the top of the Rocket; which tye faſt to the Rocket with thread, and then put in your workes; But before you put in your workes, whether they be Starres, or any other workes, you muſt put in a little Cotten-wool, being rouled in Powder-duſt, to make your Starres to take fire, or likewiſe may blow out: Having thus done, put in your Starres, or other workes, and if you make more then one tire, (as you may

do of your Starres) then you muſt put more Cotten rouled in Powder-duſt among them, or between every tire, that they may all take fire; then take your Cap, and fill the hollow place with Cotten, becauſe it is light, and likewiſe will fire quickly; which being fitted, paſte it cloſe to the top of the Coffin, that it may ſtand upright; then muſt you fit your ſtick, for the poyſing of your Rocket, which ought to be eight times the length of the Rocket without the head: You muſt get the ſmootheſt and lighteſt you can, ſuch as Basket-makers uſe, and then cut one ſide of it flat at the great end, then make two notches on the round ſide, that the one be differing from the other, ſo much as is between the choaking of your Rocket, and the end of the Vent, for if you ſhould tye it upon the Vent it would looſen the Powder, cauſing it to break in the Firing: be careful that you tie not the wrong end of the Rocket uppermoſt, but tye that end downward that is choaked, and with a piece of thread that is ſtrong, tye it to lower notch about the choaking. When you have tyed that, then tye the other higher, and let the ſtick come even with the top of the Rocket the manner whereof is ſhewed in the next figure, by the letter G, Then poyſe your Rocket, by laying it on your finger two or three Inches from the mouth; and if you finde the ſtick be too heavy, cut it ſhorter, till you finde your rocket to ballance your ſtick, for if the ſtick be to heavie, the rocket will be ſlug, and being too light, the rocket will fall before it be half up. Theſe things being provided, you have your rocket ready to be fired, which muſt be after this manner following.

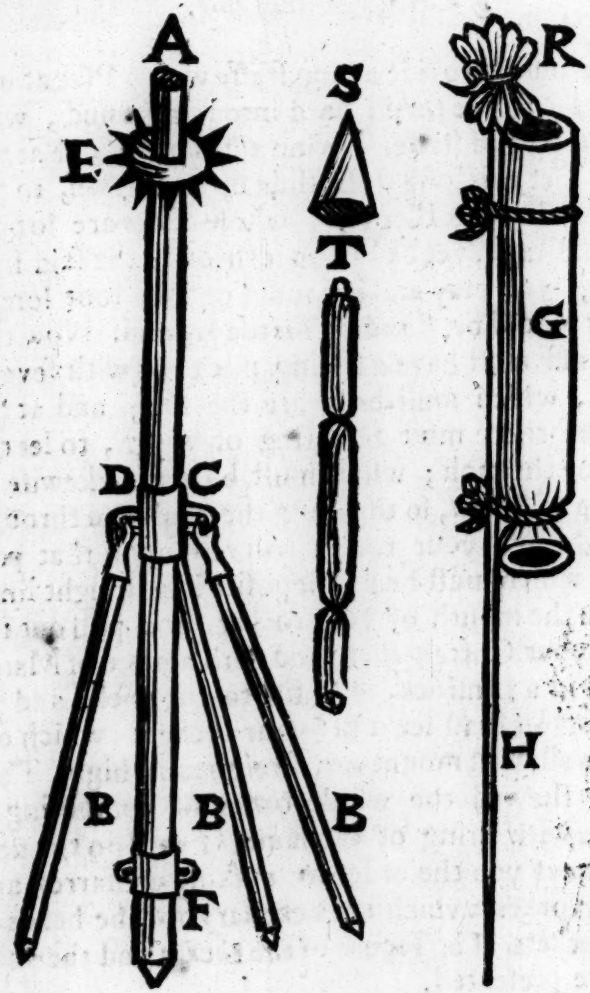
9 *The manner of firing Rockets, with the deſcription of a Staffe for the ſame.*

YOu muſt provide a long ſtaffe with a Pike at one end, to bee thruſt hard into the ground, with a three-legged ſtaffe, having a hollow hoope at the top, to let this long ſtaffe ſlide up and down, to the end that having Rockets, whoſe ſticks are longer then the ſtaffe, yet by raiſing it through the ſaid Iron hoope, you may make it foure or five foot longer then it would be, ſtanding on the ground. Now this long ſtaffe muſt have a ſliding piece cut with ſeveral points, which muſt be neare the top; and at the bottome there muſt be a ring of Wyer, to let the ſtick goe through; which muſt be made likewiſe to ſlide up & down, ſo thruſting the ſmall end through the ſaid ring, your rocket will reſt upon that part above, which muſt be juſt oppoſite in a ſtreight line; ſo open the mouth of your rocket, and pull out the end of your Cotten-wick, and with a piece of Match faſtned in a Linſtock, give fire to the wick, and by degrees you ſhall ſee it fire your rocket; which ordered well, will mount very ſtreight and high. Thus having ſhewed the whole order of compoſing a rocket, with firing of the ſame, I vvill in the next place ſhevv you the order for making of Starres, and other vvorkes, vvhich are neceſſary for the heads of your rockets. The Figure of the rocket and the ſtaffe are here preſented.

The Letter G. is the rocket vvith the long ſtick,
A. The long Staffe to riſe thorovv the ring.

B.B.B. The three-legged Staffe.

C. The Ring or Hoope of Iron, for the long ſtaffe to ſlide thorovv.



D. The Screvv to faſten to the long ſtaffe being raiſed.

E, A

E. A piece of Iron filled vvith notches to hang the Rocket on.

F the Ring of Wyre to put thorovv the ſtick, to be raiſed higher or lovver.

G. Is the Rocket.

H. The long ſtick.

---

10. *Several compoſitions for the ordering of Starrs of ſeveral colours.*

IF you vvill have your Starres of a blevv colour, vvith red, then take eight ounces of Povvder meal-ed, of Salt-peter foure ounces, and of Sulphur vive tvvelve ounces: Meale theſe very fine, and mix them together vvith tvvo ounces of Aqua-vitæ, and halfe an ounce of the Oile of Spike, and let it be dry be-fore you uſe it.

If you vvill have a beautiful vvhite Fire: take foure ounces of Povvder, tvvelve ounces of Salt-pe-ter, ſix ounces of Sulphur vive, and half an ounce of Camphire: meale your Ingredients, and mix them. Novv to povvder your Camphire, you muſt uſe a Braſſe mortar and a peſtle, diping it in Oile of Al-monds, ſo ſtirring it by degrees it vvill povvder, and then keep it cloſe from the Ayre till you uſe it, or the Camphire vvill loſe its ſpirit.

If you vvill have a vvhite Fire, and to laſt long, then take foure ounces of Povvder, one ounce of Salt-peter, eight ounces of Sulphur vive, one ounce of Camphire, and tvvo ounces of Oile of Peter:

meale thoſe vvhich are to be mealed very fine, and mix them according to the former directions.

---

11 *The order and manner of making the beſt ſort of Stars.*

HAving ſhewed the Compoſitions for Starres, now I will ſhew you how to make them, which is thus: You muſt make little ſquare pieces of brown paper, which fill with your compoſition, and ſo double it down, rouling it till you make it ſomewhat round, about the bigneſſe of a Nut, or bigger, according to the ſize of the Rocket, you may put in a dozen on the head of a ſmall Rocket, binding them round with a thread, and then draw a Cotten wick thorow them, being prepared for priming.

Alſo, there is another way which is thus; take a ſmall Rowler, about the bigneſs of an Arrow, and roule a length of paper about it, and paſt it round, letting it dry, and then you have a hollow trunck of this paper; fill this with your ingredients, thruſting it hard till it be at the top, and then cut it into ſhort pieces, about half an inch long, and then in warme glew dip one of the ends therein, and let them drie, to the end that both ends of your Starre fire not, and then put the other end into Powder-duſt; you may put them on your Rocket, in one or two tires, putting in Powder-duſt between every tire, that they may all take fire.

The priming is thus made; Take Oile of Camphire, ſoaking cotten wick therein, and being moyſt

roule

roule it in fine Powder-duſt, and then hang it up till it be thorow dry, and then keep it cloſe from ayre till you uſe it, or the ſpirit of the Camphire vvill decay.

---

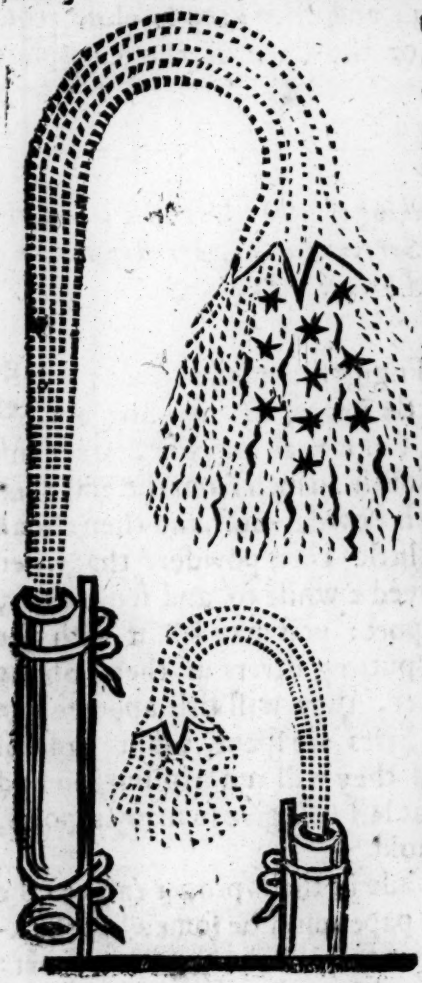
12 *The order and making of other ſeveral Fire-works for the Rocket, as Serpents, or Fiſgigs Reports, Golden and Silveer Raine, &c.*

THe Serpents or Fiſgigs are made about the bigneſſe of ones little finger, by rovvling a paper upon a ſmall rovvler, (as it vvas for your Stars) and choaking the paper Coffin an inch from the end, then fill it three inches with Powder-duſt, and then choak it, and then put in a little corn powder, that when your ſerpent have played a while to and fro, it may break and give a report: you may fill it with the Starre mixture, and putting divers of them on the head of a large Rocket, they will firſt appeare like Stars, and when the Stars are ſpent, taking hold of the powder-duſt, and they will run rigling too and fro like Serpents, and at laſt will give ſo many reports, very delightful to behold.

The reports are made in their proper caſes as the Serpents are, but the paper muſt be ſomewhat thicker, which will cauſe it to give the greater report: Theſe are to be filled with graine powder, or halfe powder and Star mixture.

To make the golden Raine, you muſt get ſtore of Gooſe-quils and cut them off next the feathers, and fill theſe quils hard with the ſame compoſition that

is in your Rocket, and muſt be put on the head of the Rocket with the open end downwards: If it were poſſible to put a thouſand of theſe quils upon the head of a Rocket, it were a dainty ſight to ſee hovv pleaſantly they ſpread themſelves in the ayre, and come down like ſtreams of gold, much like the falling down of Snow, eſpecially if the wind be any thing high.

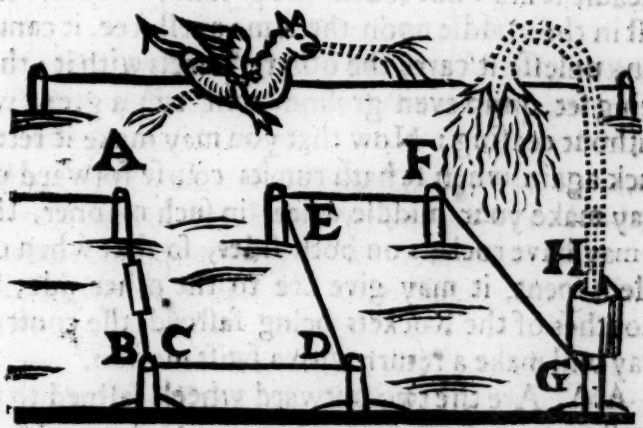


If you will make ſilver Raine it is performed as the other, only you muſt fill your quils with the ſame ingredients that you did your white Stars

13. *How*

13 *How to make your fire-works to run upon a line backward and forward.*

TAke ſmall Rockets, and place the tayle of one to the head of the other, tying a Cane to them to run on a line ſoped; the line may be a hundred yards long, or longer if you pleaſe, being well ſtretched and ſet on ſtakes, as you may ſee in the figure following; as admit the Line to be ABCDEFG, and if you give fire to the Rocket at A. it will fly to B, and then come back again to A, Then fire another to C, and that will fly to D, and back again



to C, and ſo of the reſt: And at the laſt (if you pleaſe) may be placed a pot of Fire-works, which being fired will make good ſport, having Serpents and other things in it, which will variouſly intermix themſelves

themſelves in the aire, and upon the ground and every one will extinguiſh it ſelf with a report.

---

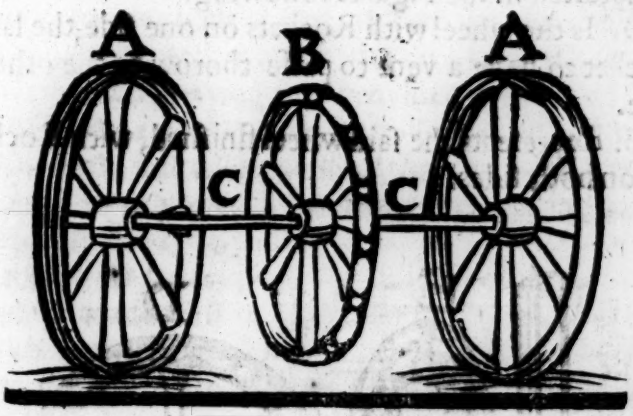
14 *How to make a Wheel of Fire-work to run forword and backward upon the ground.*

YOu muſt get a paire of light Wheels like ſpinning Wheeles, both of a bigneſſe, which muſt be faſtned to a ſmall light axell tree, in ſuch manner; that they may not move about the ſame, and on the middle of the axell tree faſten alſo a Fire-wheel (as you may ſee in the Figure following) which muſt not be ſo big in compaſſe as the two other wheels, becauſe it muſt not touch the ground, ſo that being faſt in the middle upon the ſame axell tree, it cannot run, unleſſe it carry the other Wheels with it; theſe being ſet on an even ground, will run a great way without ceaſing: Now that you may make it return back again when it hath run its courſe forward you may make your middle wheel in ſuch manner, that it may have rockets on both ſides, ſo that when one ſide is ſpent, it may give fire to the other ſide, the mouthes of the Rockets being faſtned, the contrary way will make a return with a ſwift motion.

A. A. Are the two outward wheels faſtned to the axell tree.

C C. Is the Axell tree on which the three wheels are all faſtned.

B Is the Fire-wheel in the middle, and carrieth it not ſo great a compaſſe as the other two wheels.



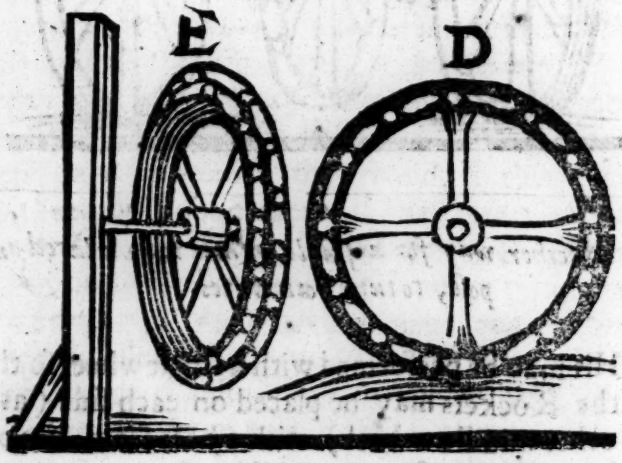
15 *Another way for a ſingle Wheel to be placed on a poſt, to turn both wayes.*

THis may be performed with a ſingle wheel ſo that the Rockets may be placed on each ſide (as in the other middle wheel) with a hole from the one ſide to the other for a vent; then place your rockets firſt upon one ſide (but ſo, that the laſt Rocket be placed over the ſaid hole) and boring a ſmall hole in one ſide of the laſt Rocket, put in a cotten wick for priming, letting it come through the hole in the Wheel, to the mouth of another Rocket which ſhall be turned the contrary way on the other ſide: ſo that the wheel having finiſhed its revolution one way, may take fire on the other ſide making a retrogade

a retrogade motion: but if you place the Rockets all one way on both ſides it will continue twice ſo long as another of the ſame bigneſſe, the form of which is expreſſed in the Figures following.

D. Is the wheel with Rockets on one ſide, the laſt Rocket to have a vent to paſſe thorow to the other ſide.

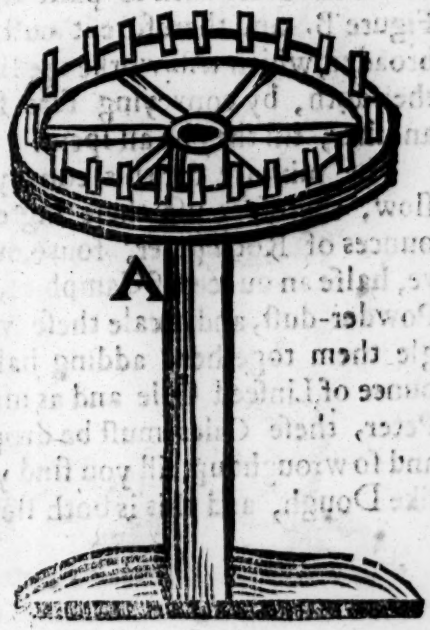
E. Repreſents the ſaid wheel finiſhed, with Rockets on both ſides.



16 *The order to make a fixed wheel, ſtanding upon a Poſt, giving divers reports.*

THere muſt be a wheel turned two foot wide, and out of the upper ſide muſt be a groof turned half an inch wide and half an inch deep, to which

which groof you muſt have a piece of wood ſo fitted, that it may juſt ſlide in, which piece of wood muſt have ſo many ſmall holes bored in it as you will have reports about it, and be ſure you ſet them not too neer together, leſt the fire of one beat the other down; having thus provided your wheel, you muſt make a conveyance, or hollow Trunk of paper, which will juſt fill it, and fill the ſame with ſome of your ſlow mixtures of Stars, and then putting on the cap of wood ſo fitted with holes, being made faſt with glew, pierce every hole into your hollow conveyance, ſo that putting a quill into every one they may take fire, and to the quill faſten a Report; ſo ſhall you have a peale of Chambers placed in a ſmall roome, which being once Fired, will follow in order, till the whole traine be ſpent. Behold the Figure marked with A.



17 *Another fixed Wheele upon a poſt, which will caſt forth many Rockets into the Aire.*

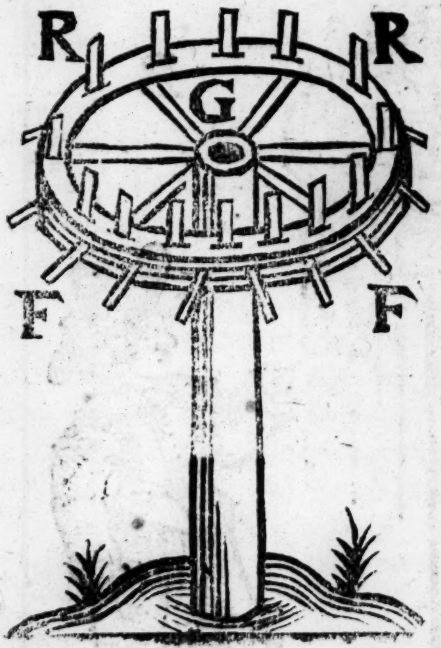
THis Whele is not much unlike the former, which will give Fire to divers Rockets ſtanding circular, differing little from the former, only you muſt make a hole for every ſtick to paſſe thorow, as it is in the Figure B. and therefore it muſt be made ſomewhat broader, which will worke the like effect that the other doth, by conveying Fire from one Rocket to another, till they be all ſpent.

The mixture for this conveyance muſt be very ſlow, therefore uſe theſe Ingredients: Take eight ounces of Roch peter, foure ounces of Sulphur vive, halfe an ounce of Camphire, two ounces of Fine Powder-duſt, and meale theſe very Fine, and mingle them together, adding halfe a quarter of an ounce of Linſeed Oile and as much of the Oile of Peter, theſe Oiles muſt be dropped in by degrees, and ſo wrought up, till you find your mixture bound like Dough, and this is both ſlow and ſure.

18 *Another dainty fixed Wheel, which will caſt forth divers Fiſgigs, or Serpents, and as many Reports.*

YOu muſt have a Wheel turned with a groof one the top thereof to put in the conveyance of paper,

per, then fit one a piece of wood (as it was before ſhewed) with ſmall holes to put in quils, which are



for Firing your Reports, and muſt be placed round about the upper part of your wheel; and on the ſide thereof divers holes muſt be made of the bigneſſe of your Fiſgigs, which muſt be pierced through to the paper conveyance, thoſe Fiſgigs that areplaced round on the ſide, and the reports on the top one train will Fire them all; and in Firing you ſhall ſee all the Fiſgigs flying round about, one after another as the fire paſſeth to them; and for every Fiſgig which paſſeth out, ſhall be fired a Report; ſo that there ſhall be a continual motion, untill the whole traine be conſumed.

G. Is the Wheel with Reports and Fiſgigs,
R R. Is the Reports on the upper part
F F. Is the Fiſgigs on the ſide of the wheel.

19 *Of night Combatants with Faulchions and Targets, Clubs, Maces, &c.*

THis is performed by two men seeming to fight, or to make way in a throng of people; the Clubs at the great ends are made like a round basket (or other form) with wicker, or small sticks on a staff, which must be filled with Rockets in a spiral forme glued and so placed that they Fire but one after another: The Faulchions are made of wood in a bowing manner having large backs to receive many Rockets, the head of one neer the neck of another, glued and fastned well together, so that one being spent, The other may take Fire; the Targets are made of thin boards, which are challenned in spiral Lines, to contein Primers to fire the Rockets one after another, which is all covered over with a thin covering of wood or past board, bored with holes spiral also, which Rockets must be glued and made fast to the place of the channels: Now if two men having in each hand a Target and a Faulchion, or a Mace of Fire, and seem to Fight, it will appeare very pleasant to the Spectators; for by the motion of Fighting, the place will seem to be full of streams of fire: And there may be adjoyned to each Target a Sun or burning Comet, with Launces of fire, which will make them more beautiful and resplendent in that action,

20 *Another dainty one with Fisgigs, called Iack in a Box.*

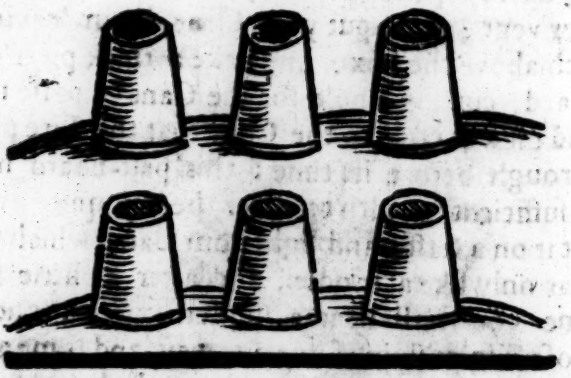
THe manner of making the same is in this order; cause a box of Plate to be made about six inches deep and of what compasse you please, (with a socket at the bottome to put in a staffe) then putting in a quantity of corne powder, or powder-dust in the bottome of the box, you may fill it with Fisgigs or Serpents, leaving a place in the middle for a Cane to goe through the bottom, which Cane must be filled with a slow receit, in which you must put a quan-

a quantity of Camphir, but no oyles, In regard of the narrow paſſage it hath to burn, without any other vent; then put your Cane down, leaving it an inch above the box, and take a thick piece of paſt-board, cutting a hole for the Cane to paſſe through and glew it cloſe to the Cane that the Fire paſſe not through before its time: this paſt-board muſt be of ſufficient breadth to cover the box quite over, then put it on a ſtaffe and light your Cane, which will appear only like a candle, and after a little ſpace of time you ſhall hear a ſudden noyſe, and ſee all thoſe Fiſgigs flying ſome one way, and ſome another: This hath given good content to the beholders? you may if you pleaſe make Clubs or Maſes of the ſame

---

21 *Of Pots of fire for the ground, which will make the Air rebound with their reports.*

MAny Pots being fired together, do give a fine repreſentation and recreation to the ſpectators; for thoſe pots being filled with balls of fire, or flying Serpents for the air, will ſo intermix one within another, in flying here and there a little above the ground and giving ſuch a volly of reports, that the air will rebound with the noiſe, and the whole place be filled with ſundry ſtreams of pleaſant fire; which Serpents will much trouble thoſe neer the place to defend themſelves in their upper parts; and they will be no leſſe buſied by the bals of fire which will ſeem to annoy their feet.



22 *The making of a fire-ball for the ground, which will be in continual motion.*

YOu muſt get a ball turned of ſome light wood, and then let it be ſawen through the midſt with a thin bow-ſaw, then make on each ſide a hollow groot to lay in two Rockets (joyned together after the manner of the Runners) and then cloſe up your ball with glew; onely in the place where the two Rockets joyn ſhall be a groof, which muſt be paſted over with paper, that the ſecond Rocket taking fire may have a vent, otherwiſe the ball will ſerve but once, then fire it, and you ſhall ſee the operation with pleaſure,

23 *The*

23 *The making of a Ball for water, which ſhall burn with great violence.*

SOw a round caſe of ſtrong Canvas, in ſhape of the caſe for a Foot-ball, but ſomewat leſſer, and very round; having thus made your caſe, then proceed to the filling of it, which muſt be done in this manner: You muſt firſt put in three or four good ſpoonfuls of your mixture following, and with a ſtick made round at one end, force it cloſe together, and ſo continue filling it, and between every filling put in your ſtick, and force it together, round it continually in your hand, till you have finiſhed it; which having done, ſow it up cloſe, and then arm it with ſmall cord, which is called marling; after you have thus done, you muſt coat it with a quantity of Roſin, Pitch and Tallow to diſſolved, and dip your ball all over in the ſame, provided that you leave two vents to fire it, which muſt be peirced a third part in to your ball, which muſt be ſtopped with two ſmall ſticks, till ſuch time that you come to uſe them. the form thereof you ſhall ſee in the next figure by the Letter D. then pulling forth the ſticks, fill the two vents with fine powder duſt, and firing it, caſt it into the water, and you ſhall have your deſire; but you muſt alwayes be ſure that your ball be throughly fired before you caſt it from you: The Receipt for this ball followeth.

Take one pound of Powder, eight ounces of Roch-

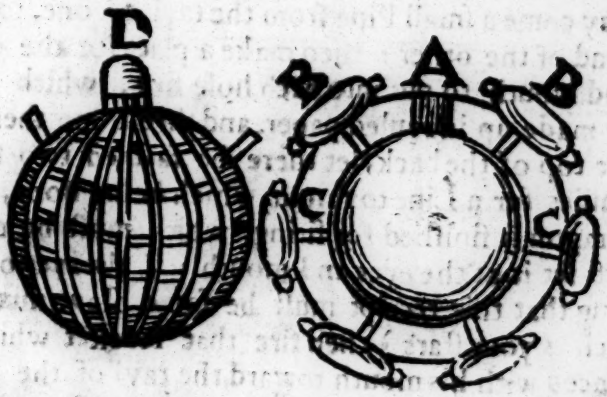
Roch-water, four ounces of Sulphur, two ounces of Camphir, one ounce of oyl of Peter, one ounce of Linseed Oyl, halfan ounce of Oyl of Spike, and two ounces of Colophonia.

---

24 *Another dainty water-ball, which will shoot forth many Reports.*

THis Ball must be made of wood (as was shewed before) in two pieces, because you may joyn it close together at pleasure, having small holes bored round about it, to put in your quills which justifie the Reports, which reports or breakers must be made of paper, choaked at both ends, and primed through the midst; they must be fastened round with pitch, ahd so covered round about, that no water may passe in: you must fill this ball in two halfs, that you may force it very close together, and when its filled, glew it fast, and arm it well with nealed wyer, then put in your breakers, with a quill which must enter into the ball, and likewise into the breaker; the form whereof you may see in the Figure folllowing: For A is the mouth of the ball where it is to be fired, B. B. are the reports or breakers, being made of paper, and filled with Corn-powder: C. C. are the Quils, which must be filled with powder dust, and serveth for firing the Reports.

The



The Receipt for this ball are theſe; Take one pound of Rech-peter, four ounces of powder duſt, three ounces of Sulphur-vive, two ounces of Camphir, one ounce of Linſeed-oyl, two ounces of Roſin, and one ounce of Oyl Benedict, you muſt powder thoſe things which are to be powdred, and mingle them altogether, and by little and little ſprinkle your Oyls, till you have wrought it like Paſt, and then uſe it: the quils muſt be filled onely with powder duſt, becauſe it muſt fire ſuddenly.

---

25 *How to make a Dragon, or the like, to run on the Line, ſpitting of fire.*

THe body of the Dragon muſt be made either with Paſt-board, or with fine rods of wicker, being hollow, with a place in the belly to put in two Rockets, and muſt be ſo ordered, that there may

may come a ſmall Pipe from the tayl of one, to the head of the other: then make a place for the eyes, and mouth, to put into each hole fire, which muſt be made up in rouled paper, and thruſt in, then on the top of the back, let there be faſtned two ſmall Pullies for a Line to run in, which being done, your Dragon is finiſhed for firing, which muſt be thus: firſt ſet it at the eyes and mouth: (alwayes obſerving that this receipt muſt be ſome ſlow mixture, ſuch as your ſtars) then fire that Rocket which is placed with his mouth toward the tayl of the Dragon, which will make it ſeem to caſt fire from thence till he come to the end of his motion; and then on a ſudden (as a creature wounded with ſome accident) ſhall return with fire coming forth of his belly: This being well ordered, will give good content to the beholders of the ſame: behold the Figure.

26. The

26 *The manner and form to repreſent Saint* George *fighting with a Dragon in Fire, on the Line.*

WHen you have formed your Figures of Paſt-board, or Wicker (as aforeſaid) you muſt make a hollow trunk through the body of each Figure, for a great Line to paſſe through, and likewiſe for a ſmaller Line to draw them to and fro from each other, which muſt be faſtned in this manner (as you may ſee in the Figure following :) At the breaſt of the Dragon let one end of one cord be tied, which muſt paſſe through the body of the George, and turning it about a Pulley at the other end, faſten it to the back of the George, and at the breaſt of the George let another cord be tyed, which muſt paſſe through the body of the Dragon (or a trunk on the back) and ſo returning about a Pulley at that end, muſt be pulled ſtreight and faſtned to the tayl of the Dragon, ſo that as you turn that Wheel, the George and Dragon will run furiouſly at each other : and when you pleaſe, you may cauſe them to make a retreat, and come on again : but by all means forget not to ſope your line extraordinary well, and likewiſe have a care that your work be not too heavy above line, but that they may hang in an equal ballance, otherwiſe they will turn their heels upward which would be a great diſgrace to the work and Work-man: And thus much to the ingenious I ſuppoſe will ſuffice : behold the Figure.

27 *How to make a Whale, a Mermaids or other to play and swim upon the water.*

YOu may make Figures of what ſhape your fancy beſt pleaſeth: the body muſt be made of light wicker rods, and in the midſt of the body let there be placed an axel-tree, having two Wheels coming into the water, yet ſo as they may not be ſeen: theſe Wheels muſt be made hollow, to contain a quantity of ſand or water: the uſe of it is to keep the body of your Figure upright, and able to ſink it ſo far into the water as is needful, & likewiſe to make it to ſwim more ſteady: note that theſe Wheels muſt be looſe, and the axeltree faſt: in the midſt of this axeltree, place three or four great Rockets one by another, with their mouths all one way: yet ſo provided that there may be ſuch a diſtance between each Rocket, that there may come a vent from the tayl of the firſt to the mouth of the ſecond, & from the ſecond to the third. And to the end that it may continue the longer in motion, you may place divers lights about the body

body, to make it the more beautiful; every of which lights extinguishing shall give a report, and so conclude. There are divers other fine Workes to be performed on the waters, which a judicious Artist may invent.

The Letter B represents the Mermaid.
C is the Wheels on the axel-tree.
D are the Rockets on the axeltree.

28 *Of divers other rare works, which are to be performed on the water.*

THose places which are situated upon Rivers or great Ponds, are proper to make these recreative Fires

Fires on; therefore if you desire to make some of consequence, they ought to be built upon Boats, or light timber, which may be framed like Beasts, or Fishes spitting fire; upon which may be built Castles, Pageants, Turrets, or other conceits as you please. As if you would present a Castle, out of which shall issue a Dragon, which shall swim through the water, and that Dragon be encountred by a horsman, which is thus performed. Cause a Castle to be framed (as is shewed) on light timber, and let the bottom of the door of the Castle with a ground plat be two foot under the brim of the water, (the reasons follow) and at a foot high within the Castle let there be a certain line tyed, which may passe through the body of the Dragon, and may be fastened neer the shoare, where must be a float sunk so farre under water, that the line may not be perceived; then fasten on your Dragon, (as was shewed before for the line) but so, that the head of this may alwayes be above the line, whereas the other was under, then at the appointed time, there must be one ready within the Castle, to fire those parts of the Dragon which is requisite; which being done (by the help of the pulleys) shall pass it through the water, which so soon as it presents it self, *Neptune* on a Sea-horse shall come, and encounter the said Dragon, and at last shall overcome it: Or you may order the work so, that which you please shall have the victory; for that which keepeth fire longest, is supposed to have the best, and that which is soonest spent, to have the worst.

G Representeth the Castle floating on the water, from whence issueth the Dragon.

E Is the Dragon comming forth of the Castle.

D Is

D Is *Neptune* riding on the Sea-horſe, comming to encounter the Dragon.

F Is the Pully that cauſeth theſe motions by the Line, to be pulled to and fro.

You may if you pleaſe, build upon Boats, or Timber, Turrets, Pageants, or Caſtles, as is ſaid, to receive or hold diverſity of Fire-works that may be made within them, which may play out, and play divers fires, as Reports, Stars, Golden Rain, Fiſgigs, Granadoes, and Balls of Fire to burn in the water, which vvill give great content to the eyes of the beholders; and in the concluſion, it may be ſo ordered, that they may fire one another, for which end they were made.

29 *The manner to compose a Ship of Fire-works, which being once fired, divers motions will present themselves.*

YOu must make a mould or body of a Ship to be made, that you may take off the upper deck, to place some wheels underneath, where you must have a fire-wheel placed with a screw on the Axel-tree; this Wheel must be placed in the stern, and must turn a rouler, on which must be two girts placed, that must passe on each side of the main mast, and run on to the fore-ship; in this Wheel there must be a hollow spoke and axeltree, as I have shewed, which must be so ordered, that the Wheel being spent, it may convey fire to a tire of Guns, lying round about, which must be fired with a close conveyance; and having passed that, it must take hold of another conveyance, which shall give fire to certain Rockets, which must be placed in the bodies of some figures representing mariners, and must be so fitted, that they may have a Cane joyned to their body to guide them, that they may run on the ropes from the Deck to the top of the masts. This and other the like may be performed with great facility; the form of which followeth.

B The fire-wheel which moveth the Rouler, and carrieth the girt whereon the Figures are placed.

C The Figures placed on the girt being in motion.

EE The Figures which stand ready to run up the cords, some half way, some at top.

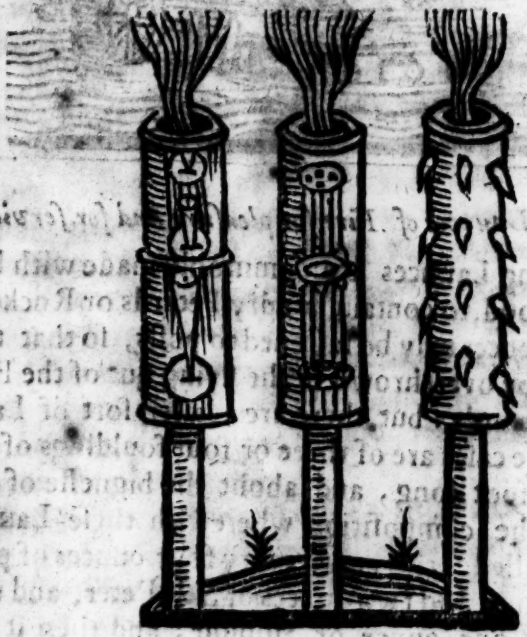
30 *Of*

30 *Of Launces of Fire for pleasure and for service.*

STanding Launces are commonly made with hollow wood, to contain sundry Petards or Rockets; these Launces may be fastened to posts, so that they may not be overthrown in the flying out of the Rockets or Petards: but there are a lesser sort of Launces, whose cases are of three or four fouldings of paper, of a foot long, and about the bigness of ones finger: the composition wherewith these Launces must be filled is this; unto every four ounces of powder you must add two ounces of Salt Peter, and unto that add one ounce of Sulphur; and then it will make a brick fire red colour before it be half spent, if the

the Launce be fired and held to it: Now if twenty ſuch Launces were placed about a great Rocket, and ſhot to a houſe or ſhip, it would produce a miſchievous effect.

Or, if unto the end of the Rocket there were faſtned an arrow (which muſt not be too heavy) and inſtead of the feathers, it ſhould be of thin white tinne plate, and if you give fire to it being thus prepared, you may ſee how ſerviceable it will prove. To the head of ſuch Rockets may be placed Petards, bals of fire, Granadoes, and the like, and ſo may be applyed to a warlike affaire.



Here

Here followeth neccſſary & ſerviceable Fire-works both for Land and Sea Execution, and firſt for the Pike.

HAving treated of Recreative Fire-works, I hold it convenient to ſpeak ſomething in brief concerning works for ſervice (neceſſary for theſe times) both for Land and Sea; which may thus be performed.

If you would make good a Breach, or enter a Ship, then take ſtrong Canvas, being cut, ſewed, and tyed hard on a Pike with Marlin-cord, then with this Receipt following, being compounded and wrought together, do thus.

Take Roch-water one part, and Peter in meal as much, Sulphur mealed two parts, three parts of Roſen in roch, Turpentine one part, as much of Linſeed-oil, one half part of Verdegreaſe, Bole-armoniack, Bay-ſalt, Colophonia, of theſe three one third part, and if you think fitting, half a part of Arſnick : Then coat the ſame over with this liquid mixture melted in a pan or pot: take four parts

of Pitch, one part of Linſeed-oyl, one third part of Turpentine, ſulphur one part, tar one third part, and one part of tallow: After theſe are melted, and being cold, bore two holes in each of the ſame an inch deep with a ſharp bodkin or iron, filling the ſame with fine bruiſed powder, and put in each hole a little ſtick of two or three inches long, to be taken out when you would fire the ſame: (This compoſition will burn furiouſly.) If you pleaſe you may faſten to the ſame receit on your Pike, divers light pipes or canes of iron, or braſſe of ſix or ſeven inches long, being piſtoll or Caliver bore, (as the Figure marked with B. ſheweth) placing the touch-hole thereof cloſe to the canvas, boring the ſaid canvas through, and priming the ſame with fine powder, paſting a paper thereon, & then coat the ſame over as before ſaid; This being charged with powder and bullet, will do great execution in a throng, either defenſive or offenſive.

How to arme a Dart or Javelin with Wild-fire, for the Sayles or ſides of Ships.

YOu may arme a Dart, Javelin, Partizan, or ſuch like weapon, to doe excellent ſervice, being in the hand of a valiant Souldier, as you may ſee by the Letter C, in the ſame: The ſame ſhould be filled with the ſelf like Receit, as before is ſhewed for the Pikes with Wild-fire, which will be a very good weapon for to go into the ſides or ſailes of ſhips.

Or you may place upon the ſtaffe of your Javelin certaine Piſtol barrels of one length, about ten or twelve inches, letting the ſame into the wood round about the ſtaffe a little, as a Piſtol barrel is into the ſtock, (as the Figure marked with the letter D, ſheweth,) which ſtaffe ſhould have ſo much ſubſtance at the one end, whereto you may nail the ſame barrels faſt at the birtch; and about the midſt of the ſame put over a hoop of Iron, as cloſe as ever you can, the which is to be charged in this manner following: *viz.* Firſt, charge every barrel with two inches of powder, after put in a bullet a little lower then the bore of the ſame peece; then take of this ſlow Receit following,

Of bruiſed powder four parts, ſalt-peeter in meal, Linſeed oile, brimſtone, finely beaten, varniſh, and of willow or hazel cole moiſtned with a little vinegar: (of all theſe five laſt Ingredients one Part;) which muſt be well wrought together with the hand in ſome wooden veſſel, till you feel that

it will cling together, of which you muſt put in after the bullet two inches, and thruſt the ſame together with a Rammer ſtick; and then again put in two inches of powder, and after that a bullet, and laſtly, two inches of this ſlow Receit, untill you have filled every one of the ſaid barrels within half an inch of the mouth, the which is to be filled up with the ſaid ſlow Receit, and powder bruiſed and mixed together, that it may the ſooner fire: This being done, bind a paper over the mouths of the ſame, until you will uſe them; and giving fire to any one of the ſame, it will fire all the other, and every one will diſcharge three or four ſhots apiece one after another, to the hurt of the enemy, being uſed in ſervice either to offend or defend; to the pleaſure to the beholders, being uſed in triumph with bullets of Receit rolled in tow, and coated with brimſtone.

How

How to enter up a paire of ſtaires, or to defend ones ſelf, being in a narrow Room.

IF you are ſtreightned up in a narrow Room, to defend your ſelf, or would enter up a paire of ſtaires, where you cannot uſe a long weapon, you may make a Logget, whoſe ſtaffe ſhall be but three or four foot long, arming the ſame with the ſame Receit as was ſhewed to arm the pikes, whereon you may place certain pipes of braſſe or iron, charged as before is taught: And if you pleaſe, you may put into the end of the ſtaffe, a Rapier blade, with a skrew, to take off and on at your pleaſure, as the Figure marked with the Letter E, ſheweth.

How to defend a Breach, a Ship, or other place of defence.

TO perform this, you may arme a Partezan Javelin, or Fork with Fire-work, and to ſhoot

every one of them with ſeven or eight piſtoll or musket bullets in nailing a plate of Iron croſſe the pike or point of the ſaid Javelin, or between the graines of the forke, piercing certain holes through the ſame, unto which with a ſtrong wyer, you may make faſt on either ſide ſo many pipes of Iron, of ſeven or eight inches long, as you think convenient to fix upon either, or any of the ſaid weapons, and charging the ſame with powder, bullet, and wad, you may cauſe the ſame to fire one after another, in filling a role of canvas ſewed together, (as the figure F. ſheweth,) with ſlow Receit, and coated, as before is ſhewed: And this being placed artificially upon the ſhort barrels or pipes (as the Figure G H ſheweth) and primed with fine powder directly againſt the Touch-holes of the barrels, paſting a little paper over the ſame, firing the ſaid trains at both the ends, which as they burn, ſhall ſtill diſcharge the ſhort peeces one after another, to the great hurt of the Adverſary.

How

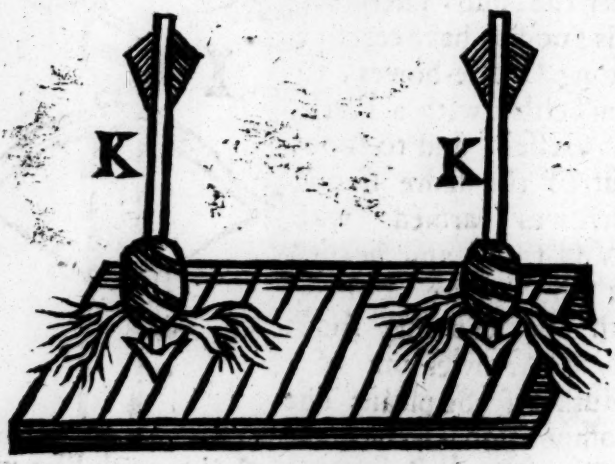
How to ſhoot Arrowes of Wild fire, out of a Croſſe-bow.

THis is an excellent way to fire the Sailes of Ships, thatched Houſes, Stacks of corn, or Hay, or any ſuch combuſtible matter apt to burn, which may be done at a pretty diſtance off, when you cannot conveniently come neer the ſame: Therefore it is good to have certaine ſtrong Groſſe-bowes, to bend either with a Rack, or Geſſel, and to ſhoot out of the ſame ſtrong Arrowes armed with Wild-fire, and headed as the Figure I ſheweth: or you may ſhoot theſe Arrowes out of a Musket if you pleaſe: The compoſition is to be made as is taught in the arming of pikes with Fire-work, which Arrowes may doe great good for divers other ſervices.

How

How to burn Wooden Bridges, Gates, Houſes, &c.

TO performe this and the like military Services, if you can come to annoint the ſame with ſome ſuch liquid compoſition as is before ſhewed for the coating of Fire-works, melting in the ſame a good quantity of bruiſed brimſtone, and ſticking in the ſame arrowes of Wild-fire, made in pro-

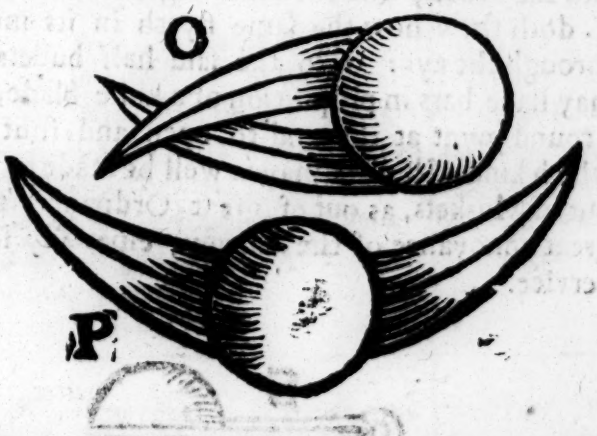


portion, as the Figure K doth ſhew. The Receipts may be made as the former for Pikes, with Wild-fire, which will certainly ſet the ſame on fire, for the Receipt is ſo forcible that it will burn in the water.

How

How to cut the Cables, or the Shrouds of Ships at a good distance.

FOr Sea-service there is deviſed out of great Ordnance to ſhoot certain Bullets that ſhall open and ſhut with a joynt in the head like a paire of Compaſſes, the arms or legs whereof are made in proportion like to the blade of a knife taper-wiſe, and bowing ſharp towards the point; as the Figure ſheweth marked with the Letter O, and how the ſame is to be put into the Peece after the Powder



and Wad; and the other Figure marked with the Letter P, doth ſhevv hovv the ſame being in its violent motion, flyeth open through the Aire like a Sithe, cutting the Cables, Shrovvds, or any thing in its vvay, being ſhot out of any peece of great Ordnance.

Others

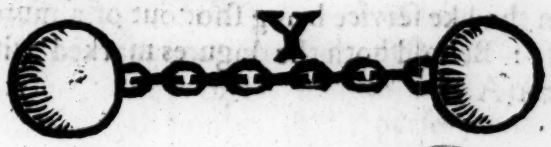
Other Devices for the cutting of Shrouds, or the like.

FOr to cut the Tackle or Shrouds of ſhips, it is good to caſt half bullets of iron, or lead, unto every of which make faſt a bar of iron, wrought either three or four ſquare, about the bigneſſe of a mans finger, and cut ſome fourteen or ſixteen inches long, with a loop at the end; unto which a Ring of iron is to be put, that the ſame may cloſe and ſhut, as the Figure with the Letter S. ſheweth: which ſheweth alſo how you muſt put the ſame into the Peece; and the other Figure with the Let- T. doth ſhew how the ſame flyeth in its moving through the ayr: or to the ſaid half bullets you may have bars in proportion of a knife blade, with a round joynt at the end to open and ſhut, the which kind of bullets may as well be made to ſhoot out of Muskets, as out of great Ordnance, to the great annoyance of the Enemy, eſpecially in Sea Service.

Ano-

Another for the same.

ALso to cut the Tackle of Ships, or to do many other good services, either with musket or great Ordnance, it is good to chain two bullets together, as the Figure Y. sheweth.



Another.

ALso, for the like purpose aforesaid, if you take a small iron Chain with good Links, rolling the same together round, that it may go easily into the Peece, close down to the wad, the same being again discharged, will spread it self at length and do good execution.

How to do excellent Service against an enemy who would enter a Breach, a Gate, a Bridge, a Ship, &c.

IF that the Enemy will enter (and that you intend not to yeild) it is necessary to have in readinesse

dineſſe divers hollow bullets made of two plates of iron, or other mettal, ſo as the one may cloſe about the other round like a box, which being filled with pepple ſtones, ſquare pieces of iron, called Dice-ſhot, musket bullets, or the like, which being diſcharged out of a murdring Peece, it will do great execution: if you will fill caſes of wood, made like unto a Lanthorn with the ſame ſtuff, it will perform the like ſervice being ſhot out of a murdring-peece: Behold both the Figures marked with the Letter A.

How to prevent a train of Powder laid to blow you up, before you enter a Ship, or other place.

IF you imagine that there is ſome train laid to blow you up (as it often happeneth) you may prevent the ſame, by waſhing certain Purſes of Canvas, filled half full of good corn-powder, and with eight or ten fiery bullets of an inch, or an inch and half

half in height; and filling the other part of the Purſe with ſlow Receipt, you may when you think good (the Receipt being well fired) throw the ſame from you, which will burſt in pieces after the lighting on the ground, and diſperſe the ſaid incloſed bullets here and there; which bullets will burn furiouſly, and if there be any train of powder laid near, it will preſently fire the ſame. The ſaid purſes are very good to throw out of hand, or may be ſhot out of a morter peece amongſt men in battle-arrry, to diſorder them, or into a town; the Figure B. ſheweth how to fill the purſes, and the Letter C. ſheweth the proportion of it, being made up, filled and coated over.

The receipt for making theſe bullets of Wilde-fire following: Take of Sulphur in meal ſix parts, of Roſin in meal three parts, melting the ſame in ſome pot or pan over a ſlow fire; then take of Stone pitch one part, of hard wax one pound, of Tar one fourth part, of Aquavitæ one half part, of Linſeed oyl as much, of Verdegreaſe one fourth part, aud of Camphir one eighth part, melting all theſe together likewiſe, and ſtir into the ſame two parts of Peter in meal; and taking the ſame from the fire, put there in four parts of bruiſed powder, working the ſame well together in your hands, and roul the ſame round of the bigneſſe that you would have your balls of, boring two holes through the ſame a croſſe, which when you would uſe, muſt be primed full of bruiſed Powder; theſe bals will be as hard as ſtone, and needeth no coating, and being fired will burn furiouſly, and cleave to any thing, not diminiſhing in quantity being burned

to

to aſhes, which aſhes will kindle an oaken board: If you pleaſe, you may ſhoot theſe bullets out of a Piece of great Ordnance. The Figures for the purſes here followeth.

B

C

Short

Short, but certain Rules for the making all ſorts of Fire-Works for recreation, as Rockets, Fiſgigs, Runners on the Line, Serpents, Stars, Fire-wheels, Clubs, Iack in a Box, *&c.* Together with the quantity of all the ingredients thereunto belonging, and the manner of compounding them.

How to compoſe a Caſtle of Fire-works with ſmall charge, that in the firing will yield as much variety, and give as much content as any: Now publiſhed for the benefit of young Practicioners. By W. R.

IN all things actual, a certain method is requiſite to be obſerved. Therefore, ſuch as intend to put in Practice theſe enſuing Inſtructions, are firſt to provide themſelves of ſuch Rocket Moulds as are ſuitable to the work they undertake. The deſcription and proportion of them, I conceive ſomewhat needleſſe, in regard any one may in Crooked Lane, *London*, be furniſhed with what ſizes they pleaſe. This being premiſed, I ſhall begin with

Fiſgigs, by many called Serpents.

THe beſt way of making them is thus: having provided a ſmall mould without a Needle, make

make a Coffin of paper fit for it, which choak half an inch from the end; then put it in your mould, and fill up three inches with Powder duſt onely, finely beaten and ſifted, then choak it again, and afterwards fill it about an inch with corn powder, then choak it cloſe, and your Fiſgig is prepared. To uſe theſe on the tops of great Rockets, put into the mouths of them ſome of the Compoſition for Stars, which will ſhew very delectable to the ſpectators; for after they have continued a good ſpace in the form and manner of Stars, they will then riggle to and fro, like ſo many flying Serpents: Of theſe Fiſgigs moſt ſorts of Fire-works are compos'd. When you can perfectly make theſe, you may then proceed to the making.

Runners on a line.

AND for them is likewiſe requiſite a Mould, five inches long without a Needle: firſt make your Coffin of paper, choak it at the end as before, then put it in your Mould, and fill it four inches with Powder-duſt. (Note that in the filling it you muſt put in but a little at a time, and ramme it down cloſe, and ſo of all others.) Then choak it, and fill the reſt of it with corn Powder (to give a report) leaving onely ſo much of the Coffin void as will ſerve to choak it. This being done, tye it to a hollow Cane three inches long; ſo as in tying of it you do not bruiſe the Rocket. And ſo have you a ſingle Runner for the Line finiſhed.

If you deſire to have a double one to run forwards, and back againe, you muſt then be provided of two

Run-

Runners made after the manner of the former, onely one to be an inch longer then the other: And to finiſh theſe, uſe this method. Firſt, tye the long Rocket to the Cane, and at the mouth of it, faſten the breech of the ſhort one, by rouling over them a little piece of paper, with ſome powder duſt in it to give fire to the long one, not forgetting to make a ſmall hole in the breech of the ſhort one with a bodkin, that ſo the long one may take fire: having done ſo, then, turn back the ſhort Rocket back ſo, that the mouth of it may reach ſomewhat further then the breech of the long one; leſt in firing it you accidentally fire both, and by that meanes ſpoil your Runners; The beſt way of tying the double ones is to faſten the ſhort one ſo, as the long one may be betwixt it and the Cane; for by that meanes it will runne without ſwagging; whereas, if they be both joyned to the Cane, as Mr. *Bates* and ſome others direct, it is both unſafe, and uncertaine: unſafe in this, in caſe the firſt accidentally break, the other with the force of it will be ſtruck off; and uncertain it is likewiſe, in regard after the firſt Rocket is ſpent, the Coffin of it coming back will ſwag and retard the paſſage of the other, and by that meanes indanger burning of the Line. Let your Line be well rubbed with ſoap, which will both ſecure it from fire, and facilitate the paſſage of the runner, likewiſe for theſe and all other, let your Powder duſt be beaten, and ſifted very ſmall, for the leaſt cornes in it may danger the breaking.

How to compoſe a Wheel.

FIrſt, provide a Wheel, either round or ſquare, the better ſort are eight ſquare, made fit to the length of the Rocket, five inches each, the beſt proportion is about ſixteen inches diameter. Now having provided a Wheel, take ſo many Rockets, made after the ſame manner as thoſe are which runne on the line, which you muſt faſten together, by joyning the mouth of the one to the breech of the other, in the ſame manner as thoſe for the line; in the tying them on, have a care you doe not bruiſe them, and be ſure to leave ſome ſpace betwixt the mouth of the firſt, and the breech of the laſt, that ſo by firing the firſt the laſt may not take, and by that meanes breed a confuſion.

You may order theſe wheeles to burn either Horizontal or Vertical, for the Horizontal provide a poſt, or ſtaffe, with a pin on the top of it to put the wheel on; if vertical, then provide a pin faſtned to the ſide.

How to make a Club to caſt forth divers Fiſgigs.

TO do this, firſt cauſe a piece of wood to be turned four inches diameter, let it be bored with an Augur of an inch and half bore from the top towards the bottome, leaving a bottome ſomewhat above an inch thick, and a place underneath to faſten a ſtaffe in; the length of it may be about eighteen inches: then draw a line ſpiral wayes about it from the bottome to the top in manner of a ſcrew, each line

line an inch and half aſunder, in that line bore ſmall holes an inch aſunder within half an inch of the bottome, and then peirce it through with a Piercer; let your holes be of that bigneſs fit to contain a Fiſgig, and make them ſomewhat ſlope-wayes, that ſo the Fiſgigs may ſtand faſt, though ſlack, otherwiſe they will not come eaſily forth.

Load your Club or Trunk with the compoſition following, and then put in your Fiſgigs made as before, priming each of them, and likewiſe each hole with powder duſt, then fire your Club at the top, and they will fire one after another, and fly about in a confuſed manner.

The Compoſition for this Club is,

Roch Peter eight ounces, Sulphur vivum four ounces, powder duſt two ounces, Camphir one ounce, Linſeed oyl halfe an ounce; beat and mix theſe according to the order preſcribed in the compoſitions following.

To make Rockets for the Air.

PRovide firſt a good mould of what ſize you pleaſe, with a Needle in it, and a Rowler with two Rammers, the one hollow for the Needle, and the other ſad, to ram it after the Needle is covered. Having made a good ſtrong Coffin of paper fit for the mould, and choaked as before, then fill it with the compoſition for that ſize your Rocket is of, the ſeveral proportions and mixtures hereafter follow. To fill it, take a little tin ſcope, and and put in about the twentieth part of the quantity it holds, and then ram it with your hollow ram-

mer, and ſo continue till you have filled it to the top of the Needle, alwayes beating it down vvith vvo or three good ſtroaks of a mallet, then fill in more almoſt to the top of the Mould, ramming it as before, but with your ſad rammer, leaving onely ſo much unfilled as that you may double down ſome of the paper and ram it cloſe, making a little hole with a bodkin to give fire to ſome corn powder, (to give a report) put within that paper as is left unfolded down, and then choak it, next prime it, as ſhall be ſhewn hereafter, and then proceed to heading of it, which you may do ſeverall wayes, either with Stars, Serpents, Crackers, or golden Rain: the compoſition for the making theſe hereafter followes. To place theſe on the Rocket; Firſt, make a thin Coffin of paper, the inſide of it ſomewhat wider than the outſide of the Rocket, which you may fit by rowling it on the outſide of the mould, and fitting it to the Rocket, then faſten it to the top of the Rocket, and ſtrew a little powder in it, having firſt made a ſmall hole in the top of the Rocket to give fire to it: in this Coffin you may place ſhort Serpents with the mouths downwards, made as before, or with Stars onely, Crackers, or golden Rain; having done this, take a peece of thin paſtboard, and with a pair of Compaſſes make a round circle in it, then divide it in two, and with the one half make a cap taper-wiſe, fit to cover the head, and with glew faſten it to it: then provide a dry Oſier ſtick about eight times the length of the Rocket, ſtrait, and flatted at the end, to this faſten the Rocket, tyed at both ends juſt in the choaking place, that ſo you may not looſen the com-

compoſition within, then poiſe the ſtick, by ballancing it on your finger three or four inches from the mouth of the Rocket.

The Ingredients for Rockets, for the Air of all ſizes.

FOr Rockets which contain from one ounce to four, to one pound of powder duſt, put two ounces of Charcoal duſt: for Rockets which hold from five ounces to ten, to one pound of pouder, put two ounces an a half of charcoal duſt: and from Rockets which hold from ten to ſixteen ounces, to one pound of powder put three ounces of charcoal duſt; but be ſure that both your powder duſt in this and all other be well beaten, and finely ſifted, as likewiſe your coal duſt. If by trying your compoſition you find it too ſtrong, you may mend it by adding a ſmall quantity of coal duſt to it: if too weak then by adding a little powder duſt. My advice is, to mix a pretty quantity together, that ſo by the tryal of one Rocket you may be aſcertained of the reſt; for all powder is not of one and the ſame ſtrength.

Priming for Rockets.

TAke Cotton wick (ſuch as the Chandlers uſe) and ſoak it in oyl of Camphir, then take it out, and roul it in powder duſt, then dry it, and keep it cloſe, otherwiſe the ſtrength of the camphir will decay. The compoſition for Stars will likewiſe fire them.

Compoſition for Stars, and firſt for theſe of a blew and red colour.

POwder mealed fine four ounces, Salt-peter two ounces, Sulphur vivum ſix ounces, beat theſe very fine, and then mix them, adding thereto one ounce of Aquavitæ, and a quarter of an ounce of oyl of Spike. To make theſe up for uſe, Take a rouler about the bigneſſe of an arrow, and roul paper on it, and paſt it cloſe, then fill it with the compoſition before preſcribed, and beat it hard, then cut it into ſhort peeces half an inch in length, dipping one end in glew, and ſtrewing the other with powder duſt, it is then finiſhed, onely let it be dry before you uſe it.

A Compoſition for Stars of a very beautifull colour, the eaſieſt, beſt, and ſureſt way, never till now made publick by any.

SAlt-peter one ounce, Sulphur vivum one ounce, powder duſt one ounce, Camphir a quarter of an ounce, beat theſe very fine and mix them, afterwards make paſte of them with the oyl of Turpentine, and then make up little pieces about the bigneſſe of a Peaſe, which roule in powder duſt, and let it dry. Of this ſort you may put two or three dozen at the head of an ordinary Rocket, the charge and trouble of making is far leſſe than any other way.

To make golden Rain.

PRovide your ſelf of a good quantity of Gooſe Quills, cut them off at the end next the feathers, then

then fill the quills with the following compoſition, and they will make a very glorious ſhew. To one quarter of a pound of powder duſt adde half an ounce of coal duſt, and for uſe put the open end of the quill downwards.

To make a Jack in a Box.

PRovide a tin box ſix inches deep, with a ſocket made under the bottom of it to place it on a ſtaff, let it be of what bigneſſe you pleaſe, in the bottom of it ſtrew ſome corn powder almoſt half an inch thick, then fill it with Serpents, or Fiſgigs placed with the mouths downward, leaving a place in the midſt for a cane to paſſe through, which fill with a ſlow compoſition; (that for Stars, or theſe following are very good) then put in the Cane, and faſten a cover of paſt-board very cloſe over the box, that ſo it may not fire before its appointed time.

A compoſition that burns with a flame ſlow and ſure.

ROch peter four ounces, Sulphur vivum two ounces, Camphir one quarter of an ounce, powder duſt one ounce. Meal theſe very fine and mix them, adding thereto one quarter of an ounce of Linſeed oyl, and a quarter of an ounce of oyl of peter dropped in by degrees, and ſo wrought to a paſte. To meal your Camphir, dip the peſtle in oyl of Almonds.

Another ſort of mixture that burns ſparkling.

POwder duſt four ounces, Coal duſt two ounces; this rammed cloſe in a Cane, renders the ſight very delectable to the ſpectators.

A com-

A compoſition for a white fire, that laſteth long.

SAlt-peeter eight ounces, Powder duſt two ounces, *ſulphure vivum* four ounces, Oile of Peeter one ounce, Camphire half an ounce; meal thoſe which are to be mealed, and incorporate them together.

How to compoſe a Caſtle of Fire-Workes with ſmall charge, that in the firing ſhall yield as much variety, and give as much content as any.

FIrſt, provide an indifferent large frame of wood, four ſquare, with little round Towers of Paſtboard, at the Corners, the beſt ſize is 18 inches ſquare, and twelve inches high, let the bottom be made firme to ſtand on any place, and the ſides with gates, (as your fancy ſhall direct) then faſten on the inſide three ledges of wood on each ſide about, each ledge with a Groof made on the top of it, then make ſo many holes in the frame of wood, ſuitable to the ledges, as you intend to have the Caſtle give reports: you may eaſily make eight to each ledg, which contains 96 Reports; you may add more which contains 96 Reports; you may adde more, as you ſee cauſe; or at the top faſten many Crackers, which at the end will fire like a volley of ſhot: The manner of making theſe Reports ſhall be ſhewed hereafter; and to place them, firſt, prime your Groof with a ſlow compoſition, and from the uppermoſt Row to the ſecond put a wicke, primed,

as

as for Rockets, and ſo from the ſecond Row to the third, leaving ſome hanging forth at the door to fire it, then put in your Reports the mouths inward, fix them to your groofs and cover it cloſe, afterward fit a board four ſquare to cover the top of the Caſtle, of each ſide half an inch broader than the Caſtle, on the four edges of it yon may faſten Paſtboard cut ſtone-work waies in manner of a battlement, and at each corner, place a ſmall jack in a box, with a long Cane in each of them, filled with ſlow compoſition, made as before; which Canes let be of the largneſſe as may burn all the time the Caſtle is firing, in the midſt of the board on the top, place a pin to put a wheel on, made of thin Deal board, five, ſix, or eight inches ſquare, proportionable to the length of the Rockets, which faſten to the board by making holes in it, to tye them to it: on the top of this Wheel you may faſten little ſtatues of Babies, as Souldiers, Drummers, or the like: and as the Wheel turns, they will move about like Anticks, vvith much delight to the ſpectators: and ſo have you finiſhed your Caſtle. To fire it firſt, fire the four Canes in the four Boxes at the corners, then fire the Wheel, at the top, and laſtly, fire the Cotton vvick at the Gate, and ſo the reports vvill by degrees fire upvvards, and in the end conclude vvith a volley of ſhot. If it be exactly made, it vvill continue a long ſpace vvith abundance of delight.

How to make Reports for a Caſtle

FIrſt make a Coffin of paper choaked as before, of vvhat ſize you pleaſe, then fill it about an inch

inch and a half vvith corn povvder, ramming it cloſe, and at the end ram in a piece of paper as you do to a musket, leaving the mouth open, and then it is finiſhed: vvhen you uſe them, prime the mouth of it but a little.

How to make Roekets for the ground.

FIrſt, provide a Rocket (ready finiſhed) as for the fire, then put the breech of it into a bladder, blovv the bladder up, and then faſten it at the choaking place, by tying it cloſe: vvhen you fire it, throw it from you, and the force of it when it comes to the ground vvill make it rebound, and ſo be in a continual agitation.

An Almanack whereby to finde the dayes of the Month this preſent year 1653. *Which with the tranſpoſition of the months yeartly, will ſerve for ever. Note, that the year begins at March.*

6 *Auguſt*	3 *May*	11 *January* 8 *October*	2 *Aprill* 5 *Iuly*	7 *September* 10 *December*	4 *Iune*	12 *February* 1 *Mach* *Novemb.*
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Thirty

Thirty dayes hath *September*,
April, *June*, and *November*.
February hath eight and twenty alone,
All the reſt have thirty and one,

An explanation of the foregoing Table.

Note that where the months end, you muſt then begin at the firſt figure of the Table, and that every leap-year *February* hath 29 dayes.

To find the day of the month by the foregoing Table.

OBſerve that the Mondayes that happen in each Month, will fall upon thoſe dayes of the Month that are expreſſed in the ſame Colume underneath it. As for inſtance, the Mondayes in *Auguſt* are on the 1,8,15,22,29. dayes of it; thoſe in *September* and *December* are on the 5,12,19,26. dayes, and ſo of the reſt. Now by this to find the day of the month you deſire, firſt, find the Month, and under it that Monday of the month laſt paſt, and then you may eaſily know it: As for example, if you deſire to know what day of the month the firſt Sunday in *May* will be: Firſt, find *May*, under it you will ſee a Figure of 2, being the firſt Monday, then reckon Tueſday 3, Wedneſday 4, Thurſday 5, Fryday 6. and Saturday 7. and ſo of the reſt. Again, if you would know what day of the week the 18 of *November* will be, look under *November* and you ſhall find the Monday next before it to be the 14. then reckon Tueſday 15, Wedneſday 16, Thurſday 17, and Friday 18. and ſo of the reſt.

FINIS.

Neceſſary Directions for *Drawing* and *Painting*.

How to take the perfect draught of any printed, or painted Picture.

TAke a ſheet of *Venice* paper, or elſe of the the fineſt white paper that you can get: wet it all over with clean Sallet-oil, then wipe the oil off from the paper as clean as you can, ſo that the paper may be dry, otherwiſe it will ſpoil a printed picture, by the ſoaking thorow of the oil: Having thus prepared your paper, lay it upon any painted or printed picture, and yon ſhall ſee the picture thorow the ſame more perfectly appearing than thorow glaſſe, and ſo with a black Lead Pen, you may draw it over with eaſe,& better firſt with a ſoft Charcoal, and then with a Pen. After that you have thus drawn the picture upon the oiled paper, put it upon a ſheet of clean white paper, and with a little ſtick pointed, or (which is better) with a feather taken out of a Swallowes wing, draw over the picture again, and ſo you ſhall have the ſame very prettily and neatly drawn upon the white paper, which you may ſet out with Colours, as ſhall be taught hereafter.

Ano-

Another way.

Having drawn the picture, (firſt, open the oiled paper) put it upon a ſheet of clean white paper, and prick over the ſame drawing with a good big pin, then from the clean ſheet that is pricked, pounce it upon another; that is, take ſome ſmall coal, pouder it fine, and wrap it in a piece of Tiffany or ſuch like, and binde it up therein looſely, and clap it lightly over all the pricked lines by little and little, and afterwards draw it over again with a pen or pencil, or otherwiſe as you pleaſe.

Another way.

Take a ſheet of thin white paper, and rub it all over one ſide with black Lead, or elſe with Vermilion tempered with a little freſh Butter; then lay the coloured ſide upon a ſheet of clean paper; then lay the Picture you would coppy out, upon the other ſide of the coloured paper, and with a ſmall pointed ſtick, or with a Swallow's feather, go over all the ſtroaks of your picture that you deſire, and then you ſhall have all the ſtroaks drawn very prettily on your white paper.

Another way.

Take a piece of clear Lantern-horn, and lay it upon your picture; then with a Pen made of a Ravens quill, draw the ſtroaks of your picture upon the horn, and when it is dry, breath upon the horn twice or thrice, and preſſe it hard upon a piece of clean

clean white paper a little wetted, and the picture that you drew upon the horn will cleave fast upon the paper.

Another way.

Take a sheet of white paper, rub it all over with fresh Butter, and dry it by the fire; then rub one side of it all over with Lamper black-lake: or any other colour finely ground, lay this paper upon a sheet of clean paper with the coloured side downwards, and upon it lay the picture you would coppy out, and trace the stroaks over with a feather of a Swallow's wing, and you shall have your desire.

Another way very pretty and easie to be performed.

Take some Lake and grind it fine, then temper it with Linseed oil, and afterwards with a pen draw with this mixture (instead of ink) all the out stroaks of any printed picture, also the muscles, then wet the contrary side of the picture, and presse it hard upon a sheet of clean paper, and it will leave behind it all the stroaks of the said picture that you drew over.

Another way much like the former.

Take printers Blacking, grind it fine, and temper it with fair water, and with a pen dipt therein, draw over the master stroaks and out lines of the Muscles: wet then a fair paper with a spunge, and clap the picture upon it, pressing it very hard thereupon, and you shall find the stroaks you drew, left upon the fair paper.

Of

Of *Painting.*

Of waſhing Maps, and other printed Pictures.

WAſhing Pictures is nothing elſe but the ſetting of them out with Water-colours, and for the effecting hereof you muſt be provided with ſtore of Pencils, ſome ſmaller than other, alſo with Ailum-water, Lime-water, Gum-water, water made of Sope-aſhes, Size, Varniſh, and ſtore of good Colours well prepared.

How to make Allum-water.

TAke a Quart of Water and boil it in a quarter of a pound of Allum, ſeeth it until it be molten, and let it then ſtand a day; with this water you muſt wet over your Pictures that you intend to colour, for it will keep the Colours from ſinking into the Paper, alſo it will adde a luſtre unto the Colours, that is, make them to ſhew faire, and it will alſo make them continue longer without fading. Some Paper will need to be wetted four or five times. You muſt let the Paper dry of it ſelf after you have once wetted it, before you either lay on your Colours, or before you wet it again, if ſo be it need a ſecond or more wettings.

How

How to make Gum-water.

TAke clean water, and put into it of Gum Arabick a little, and let it ſtand untill the Gum be diſſolved. Now you muſt have a care that it be neither too thick by reaſon of the Gum, nor yet too thin: for with the one you cannot work well, and the other will not binde faſt enough; with this water you muſt temper your Colours before you lay them on your Picture.

How to make Lime-water.

TAke unſlack'd Lime and cover it with water, an inch thick, and let it ſtand ſo one night, in the morning pour off the clear water, and reſerve it in a clean thing for your uſe; with this water you muſt temper your ſap green when you would have a blew colour of it.

How to make water of Sope-aſhes.

STeep Sope-aſhes a night in Rain water, in the morning pour off the cleareſt: this water is to temper your Braſil with.

How to make Size.

TAke a quantity of Glew, and let it ſteep a night in water to make it the readier to melt in the morning; then ſet it on a coal of fire to melt, which done (to try whether it be neither too ſtiff, nor

nor too weak, for the meaneſt is beſt) take a ſpoonfull there of, and ſet it in the ayer to cool, or fill a muſcle-ſhell with it, and let it ſwim in cold water to cool the ſooner: If it be too ſtiff when it is cold, put more water unto it, if too weak then put more Glew unto it, and when you will occupy it, make it luke-warm, and ſo uſe it: this is to wet your cloaths in if you intend to paſte your Map or Pictures upon cloth.

How to prepare your Colours.

SUch as have need of grinding, you muſt firſt grinde them with fair water, and then put them upon a ſmooth chalk-ſtone, and let them dry: then grinde them again with Gum-water, and reſerve them in muſcle-ſhels for your uſe.

Chuſe to lay on the thinneſt and moſt tranſparent colours, eſpecially if it be good work that you are to colour, ſo the one will ſet out the other; but if the work be none of the beſt, then endeavour to hide the imperfections thereof by laying your colours the thicker on it.

A Sea Colour.

Take Privet-berries when the Sun entreth into *Libra*, about the thirteenth of *September*, dry them in the Sun; then bruiſe them, and ſteep them in Allum-water, and ſtrain them into an earthen Porringer that is glazed: or you may uſe them before you dry them, for the drying of them is to make them keep long.

Another.

Take blew Inde and ſteep it in water, and put to it a little Verditer.

A yellow Colour.

Take yellow berries and bruiſe them a little, and ſteep them a quarter of an hour in Allum-water, then ſtrain them if you will, or let them ſtand in the liquour, and work therewith.

A Ruſſet Colour.

Take the fatteſt Sut you can get, and put it into a pot of clear water, ſo that it be covered two or three fingers, and let it ſeeth well, which done, ſtrain it through a cloath, and ſet it on the fire again to thicken (but take heed you ſet it not on too hot a fire, for fear of burning it) ſo let it boil gently untill it be as thick as you would have it.

Colour for faces.

Firſt, lay upon the cheeks little ſpots of Lake or red Lead, then come all over it with white, and a little Lake; ſhadow it with Lam-black or Umber, and white Lead.

Hair Colour.

Take umber of Spaniſh brown, grinde it and temper it with Gum-water.

Colours for naked Pictures.

Take white Lead and a little Vermilion, temper them and lay them on, ſhadow it with Bolearmenick in the middle, and adde a little Sut to the utmoſt or double hatches.

A Colour for dead Corps.

Change white Lead with a little of the water of yellow

yellow berries, and waſh the Picture all over, then change it with blew Inde, and ſhadow it with bleu Inde, and ſhadow it in the ſingle hatches and leaneſt places: then take Sut, yellow berries and white Lead, and with that ſhadow the darkeſt places.

A bloud-red Colour.

Sinaper, Lake, and Vermilion make a good bloud red: ſome have commended Mutton-bloud very highly, but I never tried it.

How to make Mutton blood-red.

Take ſome of the cleareſt bloud of a ſheep, and put it into a bladder, and with a needle prick holes in the bottom of it, then hang it up to dry in the Sun; this ſaith a Painter (that told it me for a ſpeciall experiment) will make tranſparent and excellent bloud-red colour, which you may alſo diſſolve in your Allum-water, according as you have need thereof.

Colours for Garments.

A Purple Colour.

Take Logwood and ſeeth it in Vineger and ſmall Beer in an earthen pot, and put a little allum therein, untill you taſte it to be ſtrong on the tongue.

A red Colour.

Boil Braſil as you did the Logwood, and it will make a red colour: if you would have it a ſad red,

mingle it with pot-aſh-water, if you would have it of a light red, temper it with white Lead,

A Crimſon.

Cynaper tops: Cynaper lake: or Vermilion.

A green colour.

Take Privet berry water, and change it with yellow berry water, and it giveth a perfect green, for the ground and it is much uſed.

Another green.

Take Spaniſh green clean pickt and ſteeped in Rheniſh wine: ſtrain it, and put it into a little Honey or white Sugar-candy, and it will make an excellent green.

For a light green.

Temper Verdigreaſe and white Lead, 2 Verdigreaſe as much yellow berries, and a little white.

Yellow colour.

Orpiment and Saffron, Maſticot, Gambougium; either of theſe give a very good yellow.

Blew colours.

Verditer, Azure or Bice, blew Inde.

Colours for building.

Lay black and white Lead for the walls of Churches, Conduits, and greater buildings; Bolus for the pillars, and leſſer houſes; red Lead for Tiles; for the Leads blew and white; for Cottages Sut alone.

Colour s

Colours for Landskip.

Lay Verditer, blew, white, and green; or firſt go all over it with Saffron, and white: then put a little Sut to them, and go over it again.

Or firſt take green and white Lead, and go over it, ſhadow it with a little more green, then with white, and laſt of all with green, a little white and yellow berries.

Sky colours.

Braſil and white Lead is the lighteſt, then light purple and white, then Inde blew and white, the darkeſt of all is Inde blew.

Cloud colours.

The lighteſt of all is white Lead and Inde blue, a like quantity of each: the next, a great deal of Inde and a little white; then purple and white with a little Braſil; then white Lead and yellow berries.

Colours for the Sun-beams.

Lay yellow berries with a little white, ſhadow it with Saffron and red Lead.

A motley green.

This colour is compounded of red and green.

A Lincoln green.

This colour is compounded of a good green and Saffron.

A popinjay green.

This colour is compounded of azure and maſtic cot, or blew and yellow.

An excellent green.

Take Coppe plates, put them into a pot, and pou

ſome diſtilled Vineger unto them, ſet them in a warm place untill the Vineger become blew, then pour that liquour or coloured Vineger into another Pot well leaded, and pour more Vineger upon the Copper-plates again, letting that alſo ſtand untill it be of a bleu colour, then pour it unto the former liquour, this you may do ſo often untill you have liquour enough, then let that liquour ſtand in the Suu untill it be thick enough.

A *Lion-tauney.*

This colour is made of red lead and maſticot.

A *Peach colour.*

This colour is compounded of Ceruſe and Vermilion.

A *braſſe colour.*

This is made of maſticot and umber.

A *marble or aſh colour.*

This colour is made with black and white.

A *ruſſet colour.*

This colour is made with a little white, and a good quantity of red.

A *brown blew.*

It is made of two parts Inde baudias, and a third of Ceruſe.

A *crane colour.*

It is onely made of red Lead ground with Gum-water.

To write Gold with the pen or pencil.

Take a ſhell of Gold, and put a little Gum-water into it, and ſtir it about, and then you may work with it as with colours.

Thus by a little practiſing and tempering your colonrs one with another, you may with the ſame colours

colours compound divers others that I have not mentioned, nay, almoſt what you liſt.

Experiments perform'd by Legerdemain.

How to make it freez by the fire ſide.

THis feat cannot be performed at every time, but onely in winter, and at ſuch times as ſnow may be had, and he that will ſhew it, muſt have in readineſſe an handful of ſalt. The time ſerving, and the party provided, let him call for a joynt-ſtooll, a quart pot, and a handfull of ſnow, a little water, and a ſhort ſtaff or ſtick, firſt, let him pour a little water upon the ſtool, and upon it let him ſet the quart pot, and put the ſnow into the pot, the ſalt alſo, but privately, then let him hold the pot faſt with his left hand, and take the ſhort ſtick in his right, and therewith churn the ſnow and ſalt in the pot, as if one ſhould churn for butter, and in half a quarter of an hour the pot will freez ſo hard to the ſtool, that you can ſcarcely with both hands pull it off from the ſtool: there is a natural reaſon may be given for this, which he that is a Scholar need not be told, and for a common Jug-

ler I would not have ſo wiſe as to know, therefore I omit it.

How to make two Bells come into one hand, having put into each hand one.

THis feat muſt be performed with three Bells, you muſt put one Bell into your left ſleeve, then put one bell into one hand, & another bell into the other hand (they muſt be little morris bells) withdraw your hands, and privily convey the bell in your left hand into your right hand: Then ſtretch both your hands abroad, and bid two folks hold your hands faſt, but firſt ſhake your hands, and ſay, do you hear them. The Bell that is in your ſleeve will not be known by the ratling, but that it is in your hand: Then ſay, he now that is the arranteſt Whoremaſter or Cuckold of you both, ſhall have both the bells, and the other ſhall have none at all; open your hands then, and ſhew them, and it will be thought that you deal by Art *Magick*.

How to make a Jugling book or book of Waggery.

YOu muſt provide a paper-book in octavo, of what thickneſſe you pleaſe; firſt turn over ſeven leaves of it, and then upon both the open ſides, draw or paint the pictures of flowers, then turn over ſeven leaves more, and paint the very ſame; do this untill you have turned the book once quite over; Then unto the farther painted leaves, paſte a little ſtay of paper or parchment one directly over another: Then turn over the book again, and having

ving turn'd every ſixt leaf, draw the picture of flower-de-luces, and then paſte ſtayes of parchment upon them as you did upon the firſt; but theſe ſtayes, muſt all of them be a little lower than the former. Then turn over the book again, and after the fift leaf throughout the book is turned, paint horns, do thus untill you have painted the book full of pictures, onely let there be one part of the leaves fair paper; having thus finiſhed the book, when you uſe it, hold it in your left hand, and with your right hand, your thumb ſet upon the parchment ſtayes, ſhew them orderly and nimbly, but with a bold and audacious countenance, for that muſt be the grace of all your tricks: ſay, this book is not printed thus as ſome of you may ſuppoſe, but it is of ſuch a property, that whoſoever bloweth on it, it will give the repreſentation of whatſoever he is naturally addicted unto, and then turn the book, and ſay, ſee its all fair paper.

Boxes to change Grain.

MAke one box of Wood, Tinne, or Braſſe: let the bottome fall a quarter of an inch into the box, and glue thereon a laying of barley, or ſuch like grain: draw the box with the bottom downwards, and ſay, Gentlemen, I met a Country man going to buy barley, and I told him I would ſell him a peniworth, alſo I would multiply one grain into ſo many buſhels as he ſhould need, then caſt a barly-corn into your box, and cover it with a hat, and in the covering it, turn the bottom upſide down: then cauſe ſome body to blow on the hat, then

then uncover it, and they will think ſtrangely of it. You may make another box of wood, like unto a bell, to hold ſo much juſt as your former box will, and make a bottom unto this box of ſhoo ſole leather, to thruſt into the bottom of the bell: then fill it with barley, and thruſt up the leather bottom, for it will keep the barley from falling out, take this box out of your pocket, and ſet it down gently upon the table, and ſay, I will not cauſe all the barley to go out of my meaſure into my bell, then with a hat cover the box that hath the barley glewed unto it, and in covering it, turn it with the barley downward: then ſay, firſt, let us ſee whether there be nothing under the bell, and clap it hard down upon the table, ſo the weight of the barley will thruſt the bottom down; then bid ſome one blow hard on the hat, then take it up, where they will ſee nothing but an empty meaſure, then take up the bell, and all the barley will pour out. Sweep it then preſently into your hat or lap, leſt their buſie prying may chance to diſcover your leather bottom.

A conceit to procure laughter.

TAke a ball in one hand, and another in the other, and ſtretch your hands as far as you can one from the other, and if any will, lay a quart of wine with him, that you will not withdraw your hands, and yet will make both of them come into either hand which they pleaſe: It is no more to do, than to lay one down upon the table, and turn your ſelf round, and take it up with the other hand, and your wager is won, and it will move no

ſmall.

ſmall laughter to ſee a fool ſo looſe his money.

How to knit an hard knot upon an handkercher, and to ſeem to undo the ſame with words.

MAke one plain looſe knot, with the two corner ends of a handkercher; and ſeeming to draw the ſame very hard, hold faſt the body of the ſaid handkercher (near to the knot) with your right hand, pulling the contrary end with the left hand, which is the corner of that which you hold. Then cloſe up handſomely the knot, which will be yet ſomewhat looſe, and pull the handkercher ſo with your right hand, as the left hand end may be near to the knot: then will it ſeem to be a true and firm knot, And to make it appear more aſſuredly to be ſo indeed, let a ſtranger pull at the end which you hold in your left hand, while you hold faſt the other in your right hand; and then holding the knot with your fore-finger and thumb, and the nether part of your handkercher with your other fingers, as you hold a bridle, when you vvould vvith one hand ſlip up the knot, and lengthen your reins. This done, turn your handkercher over the knot, vvith the left hand, in doing vvhereof, you muſt ſuddenly ſlip out the end or corner, putting up the knot of your handkercher vvith your fore-finger and thumb, as you vvould put up the aforeſaid knot over your bridle. Then deliver the ſame (covered and vvrapt vvithin the midſt of your handkercher) to one to hold faſt, and after the pronunciation of ſome vvords of art, and vvagers laid, take the handkercher and ſhake it, and it vvill be looſe.

How

How to transform any one ſmall thing into another form by folding of paper.

TAke a ſheet of paper and fold or double the ſame, ſo as one ſide be a little longer than the other: then put a Counter between the two leaves of the paper up to the middle of the top of the fold, holding the ſame ſo as it be not perceived, and lay a Groat on the outſide thereof, right againſt the Counter, and fold it down to the end of the longer ſide: and when you unfold it again, the Groat will be where the Counter was, and the Counter where the Groat was, ſo as ſome will ſuppoſe that you have changed the money into a Counter, and with this many feats may be done.

How to convey money out of one of your hands into the other by Legerdemain.

FIrſt, you muſt hold open your right hand, and lay therein a teſter, or ſome big piece of money, then lay thereupon the top of your long left finger, and uſe ſome words of art, and upon the ſudden, ſlip your right hand from your finger, wherewith you held down the teſter, and bending your hand a very little, you ſhall retain the teſter ſtill therein, and ſuddenly drawing your right hand thorow your left, you ſhall ſeem to have left the teſter there, eſpecially when you ſhut in due time your left hand. Which that it may more plainly appear to be truly done, you may take a knife, and ſeem to knock againſt, ſo as it ſhall make a great ſound: but inſtead

ſtead of knocking the piece in the left hand (where none is) you ſhall hold the point of the knife faſt with the left hand, & knock againſt the teſter held in the other hand, and it will be thought to hit againſt the mony in your left hand. Then after ſome words of art pronounced, open your hand, and when nothing is ſeen, it will be wondered at, how the teſter came removed.

How to make a ſix-pence ſeem to fall through a Table.

YOu muſt have an handkercher about you, having a Counter neatly ſewed in one of the corners of it: take it out of your poeket, and deſire ſome body to lend you a teſter, and ſeem to wrap it up in the midſt of the handkercher, but retain it in your hand, and inſtead of ſo doing, wrap the corner in the midſt that hath the Counter ſewed in it, and then bid them feel if it be not there, which they will imagine to be no other than the teſter that they lent you, then bid them lay it under a hat upon the table, and call for a baſin of water, hold it under the table, and knock, ſaying, *vade*, come quick, and then let the ſix-pence fall out of your hand into the water. Then take up the hat, and take the handkercher and ſhake it, ſaying, that is gone, then ſhew them the money in the baſin of water.

How to ſeem to blow a ſix-pence out of another mans hand.

TAke a ſix-pence, blow on it, and clap it preſently into one of your ſpectators hands, bidding them

them to hold it faſt: Then aſk of him, if he be ſure to have it, then to be certain, he will open his hand and look. Then ſay to him nay, but if you let my breath go off, I cannot do it. Then take it out of his hand again, and blow on it, and ſtaring him in the face, clap a piece of horn in his hand, and retain the ſix pence, ſhutting his hand your ſelf. Bid him hold his hand down, and ſlip the teſter between one of his cuffs. Then take the ſtone that you ſhew feats with, and hold it unto his hand, ſaying, *By vertue hereof, I will and command the money to vaniſh you hold in your hand, vade*, now ſee: when they have looked, then they will think that it is changed by the vertue of your ſtone. Then take the horn again, and ſeem to caſt it from you, retaining it, and ſay, *vade*, and anon ſay, you have your money again: He then will begin to marvel, and ſay, I have not, ſay then to him again, you have, and I am ſure you have it: Is't not in your hand? If it be not there; turn down one of your ſleeves, for it is in one I am ſure, where he findeth it, he will not a little wonder.

How to caſt a piece of money away, and to finde it in another mans mouth, pocket, or purſe.

THe Jugler calls for ſome one piece of coin, as a teſter or a ſhilling of any one in the company, he willeth him to mark it with what mark he will, then he taketh it, and caſteth it away, and cometh to his confederate (who is furniſhed before-hand with the like piece of coin, marked with the very ſame mark) and bids him deliver the money

ney out of his pocket, purſe, or if he ſay the word, mouth; for this is concluded of before hand. Now this confederate, to make the matter ſeem more ſtrange, will fume and fret, asking how he ſhould come by it, till having found the mark, he will confeſſe it to be none of his, wondring at his skill, how he ſhould ſend it thither: and all the reſt be taken with a reall admiration of his extraordinary cunning.

How by the ſound of a Counter phillipped to tell what ſide is uppermoſt, whether croſſe or pile.

THe Jugler draws a Counter out of his pocket, and ſaith to the company, See here is a Counter, take it who pleaſe, and let him phillip it up, and I will by my cunning tell you whether croſſe or pile be uppermoſt by the very ſound, for you ſhall hoodwink me. Now there are three, or four, or more confederates in the place, who ſeeming ſtrangers as well as the reſt, will be very importunate to have the phillipping it, and before one of theſe ſhall have it, who by ſome ſign of the fingers or countenance (fore known to the Juglet) do give him information after he is demanded. Of the ſame nature is that trick formerly mentioned in the book, and called, The decollation of *John Baptiſt*.

To make one dance naked is a trick of the ſame nature, for the party afore hand is agreed to do it, and alſo the manner and circumſtances: So that the Jugler to blind the people, pronounceth ſundry words to ſuch a perſon, he then begins to rave like a mad man, and puts his cloaths off with a kind of violent

violent careleſneſſe, though God knowes, the party knowes as well what he doth, as your ſelf that reads it.

After the ſame manner ſhall you know what money another hath in his purſe, and caſting money into a pond, and finding it under a ſtone or threſhold in an other place.

Alſo to make a piece of money to leap out of a cup and run to another, by means of a ſmall hair faſtened to the money, which hair the Confederate guideth, with a multitude of ſuch like ſtrange feats, which may ſeem impoſſible to the judgement of the common people to be effected without the aſſiſtance of the Devil, or ſome familiar, which to nominate is neither needful, nor will my occaſions permit ſo much leiſure as to do it.

Experiments in Arithmetick.

I.

To finde what number of Men are containd in a ſquare Battail.

A Square in Geometry is called, A right lined plain figure, conſiſting of four equall ſides, and ſo many right and equal angles; every

every of which ſides is ſaid to be the Square of the ſaid figure, and any one of theſe ſides being multiplied in it ſelf, produceth a Square equall to the Square of whoſe ſide this multiplication was made.

Wherefore if you ſhould come in place where a body of men were placed in a Square body, you may readily tell what number there is of them, by counting the number of men on any one ſide, and that number multiply in it ſelf, the product of that multiplication ſhall be equall to the number of men in that whole body.

As for example,

If there were ten men on each ſide of the Square Battail (as in this figure there is) If then you multiply 10 into it ſelf, the product will be 100, which is the number of men contained in the ſaid Battail.

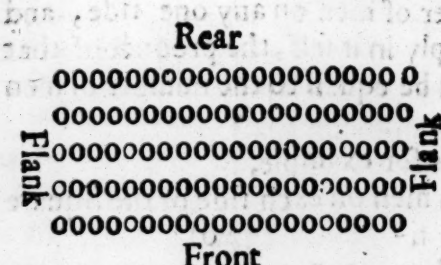
II.

To finde what number of men are contained in a Battail, whoſe front and flanks are unequal.

THis propoſition very little differeth from the former, for whereas before you multiplied an

one ſide in ſelf, you muſt in this multiply the Front or Rear by either Flank, and the product ſhall give the number of men contained in the ſaid Battail.

Example,



Suppoſe there be 20 in the Front and 5 in the Flank, and you deſire to know what number there is in the whole body: If you multiply 20 by 5, your product will be 100, the number of men contained in the whole Body.

III.

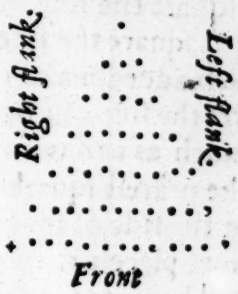
To finde what number of men are contained in a Triangular Battail.

A Triangular battail cannot be compoſed except there be an odde man in the Front, and conſequenly, on either Flank: Wherefore, to finde what number of men are contained in ſuch a Battail, you muſt multiply either Flank in it ſelf, and the product ſhall be the number of men contained in the whole Battail.

Ex-

Example,

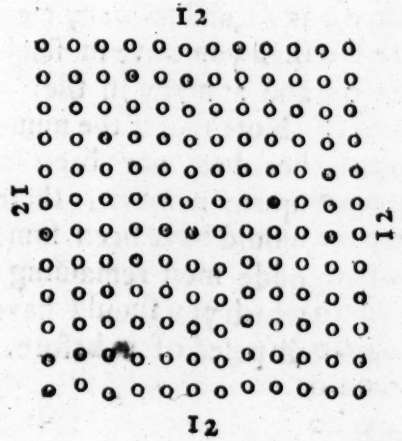
Let there be in either Flank 7, now we know that 7 is the Root of 49; wherefore you may conclude 49 to be in the whole.

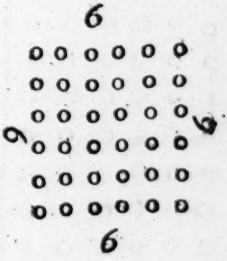


IV.

Of two Square Battails to make one entire battail which shall containe both the other.

A General having in two several places two square Batails of men, and commanding his Major or other Officers to reduce them into one entire body, I demand how that may be done? Let the two Battails be unequal, as one of 10 the other of 6, as in this Fignre is seen.





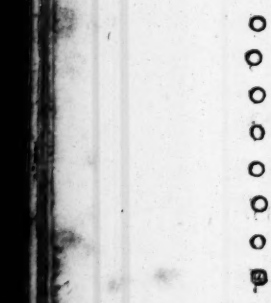
Example

First, ſquare the ſide of the greater Battail 10 *fecit* 100. then ſquare the ſide of the leſſer Battail, 6 *fecit* 36. which added make 136. the ſquare root extracted gives the ſide of a Battail equal to them both: but for as much as 136 is no ſquare number, you muſt finde the neareſt ſquare that may be leſſe, and that ſhall be the ſide of the entire Battail, which is 11. wherefore place 11. in rank, and 11. in file, and you ſhall have 121. in your Body, and 15. men over, which you may ſend out for Scouts or Centinels, or otherwiſe diſpoſe of them as occaſion ſerveth.

V.

A number of men being delivered to an Officer to make thereof a Square Battail, and ſuddenly to tell how many ranks he ſhall have, and how men in each rank.

Suppoſe the number of men delivered to be 144. therefore extract the ſquare Root of 144, which is 12, and ſo many men ſhall you have in flank and as many in file. Note that if the number had not been a ſquare number, there would have been ſome odde men remaining, which you ſhould have diſpoſed of before.



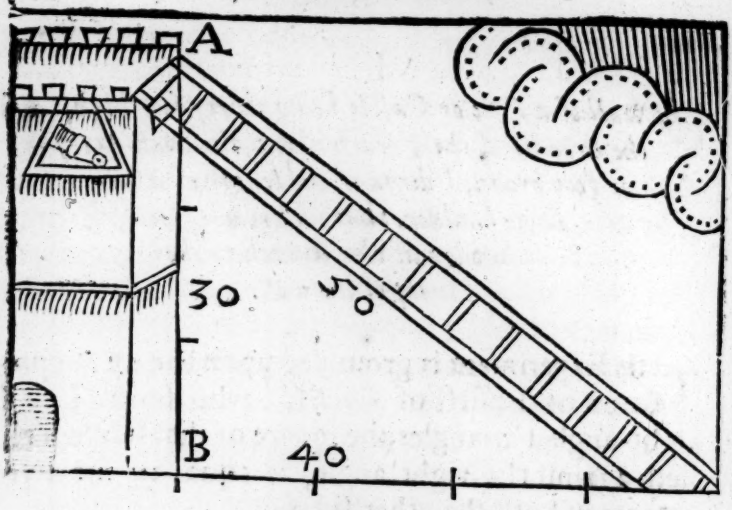
VI.

The Wall of a Fort or Caſtle being thirty foot high, and the breadth of the Trench about the wall forty foot broad, I demand the length of a ſcaling-Ladder, that will reach from the edge of the Trench to the top of the wall.

THis Experiment is grounded upon the 47 Ptopoſition of the firſt of *Euclid*, who ſaith, In all right-angled-triangles, the ſquare of that ſide which lieth againſt the right angle, is equal to the two ſquares of both the other ſides.

From whence we may gather, that if the heighth of the Wall be ſquared, and the breadth of the Trench likewiſe ſquared, and thoſe two ſquared numbers added together, and from them extract the ſquare Root, that Root ſo extracted ſhall be the length of the Scaling-ladder required:

As for Example, in the Figure following;



Let AB represent the Fort, being 30 foot high, & BC the breadth of the Trench, 40 foot; then ſquare 30, *fecit* 900, likewiſe ſquare 40, *fecit* 1600: which added make 2500, the Root of which number is 50, the length of the Hipothenuſuall or Scaling ladder required.

VII.

Admit the Semidiameter of the earth to be 3436 miles, & that there is a Mountain one mile in heighth, I demand how far ſuch a Mountain may be ſeen at Sea or on Land.

ADde the Semidiameter of the earth and the Mountain together, *fecit* 3437, whoſe ſquare is 11812969, from which ſubſtract the ſquare of the ſemidiameter of the earth, *viz.* 11806096, there remains 6873, whoſe Root is 82 and three fourths; wherefore you may conclude, that the Mountain may be ſeen almoſt 83 miles. *Hom*

VIII.

How to know the burthen of a Ship.

TO perform this, you muſt take the length thereof at the Keel, the breadth at the Beam, and the depth in hold, and multiply them one in the other, the laſt product being divided by 100 gives you his Tunnage, which is the Kings allowance.

Example of a Ship whoſe length at the Keel is 65 foot, his breadth at the beam 26 foot, the depth in hold 10 foot, which number multiplied each by other, produceth 16900, which being divided by 100, gives you 169 Tun, which is the burthen of the ſaid Ship.

IX.

The General delivered to his Maſter Gunner 3 Peeces of Ordnance, together with 168 pound of powder, the biggeſt of which Peeces ſpent at a ſhot 6 pound, the ſecond 4 pound, and the third 2 pound, who commanded him to imploy them againſt the battery of a Sconce, demanding of the Gunner, how many ſhots each Peece would make, being diſcharged one as often as an other, and alſo how much powder each Peece would ſpend.

LEt the quantity of each Peece *lib.* be ſet down into order, one under an other, and added into one entire ſum, as 6. 4. 2. 2 *fecit* 12, behind which towards the right hand ſet down the ſumme of the powder delivered, *viz.* 168, which if you divide by 12, the quotient will be 14, which certainly telleth that they will make 14 ſhots a piece againſt the Sconce.

lib.		
6	*lib.*	
4	168	ſh.
2	12	14
2	x	
12		

Now

Now to know how much powder each Piece will ſpend, multiply 14 by 6, *fecit* 84, for ſo much will the firſt Piece ſpend; again multiply 14 by 4, *fecit* 56, ſo much will the ſecond ſpend; and laſtly multiply 14 by 2, *fecit* 28. ſo much will the laſt Piece ſpend: which being added into one entire ſumme, the total will be 168 pound, which is equal to the powder bythe General at firſt delivered.

lib.
84
56
28
168

IX.

A General having drawn the platforme of foot, demanded of 50 *Pioneers what time they required to finiſh it in: who replied* 6 *weeks, or* 36 *daies (which is all one) but the expedition was ſuch that it muſt be finiſhed in* 8 *daies, now would I know what nnmber there muſt be imployed.*

THe reſolution of this queſtion to ſome may ſeem difficult, but to others very plain and eaſie, for if you multiply 50 (which is the number of Pioneers) by 36 (the number of daies which they require) and divide that product by 8 (which is the time that the Fort muſt be finiſhed in) the quotient of that diviſion will be 225, and ſo many muſt be imployed to finiſh it in eight daies.

Pleaſant

Pleaſant Queſtions In ARITHMETICK.

Queſtion I.

To tell the number that another man ſhall think, be it never ſo great.

LEt the party that thinketh, double the number which he thought, which done, bid him multiply the ſum of them both by 5, and give you the product (which they will never refuſe to do, it being ſo far above the number thought) from the which if you abate the laſt figure of the product (which will allwaies be a Cipher or 5) the number thought will remain.

Example,

Let the number thought be 53, which doubled maketh 106, and multiplied by 5, make 530; then if you take away the Cipher which is in the laſt place, there will remain 53 the number thought.

Queſt. II.

Quest. II.

Of the accusation of a Thief.

A Thief breaking into an Orchard, stole from thence a certain number of pears, and at his coming forth he met with 3 men one after another, who threatned to accuse him of theft, and for to appease them, he gave unto the first man half the pears that he stole, who returned him back 12 of them. Then he gave to the second half of them he had remaining, who returned him back 7. And unto the third man he gave half the residue, who returned him back 4, and in the end he had still remaining 20 pears. Now do I demand how many Pears he stole in all? To answer this question you must work backward; for if you take 4 from 20, there will remain 16, which being doubled make 32, from which abate 7, and there will remain 25, which being doubled makes 50, from which substract 12 and there will remain 38, which again doubled make 76, the true number of pears that he gathered.

Quest. III.

Of three Sisters.

A Certain man having three Daughters, to the Eldest he gave 22 apples: to the second he gave 16 apples: and to the third he gave 10 apples: and sent them to the Market to sell them, and gave them command to sell one as many for a peny as the other (namely 7 a peny) and every one to bring him home so much money as the other, and neither change

change either apples or monies one with another; How could that be?

This to ſome may ſeem impoſſible: but to the Arithmeticians very eaſie. For whereas the eldeſt had 3 peniworths, and one apple over, the ſecond 2 peniworths and two apples over, and the yougeſt had one peniworth and three apples over: So that the youngeſt had ſo many ſingle apples, and one peniworth as the eldeſt had peniworths and one apple over, and conſequently the ſecond proportional to them both.

They made their Markets thus: A Steward coming to buy fruit for his Lady, bought all the apples they had at 7 a peny, leaving the odde ones behind, then had the eldeſt Siſter three-pence and one apple, the middle Siſter two-pence and two apples, and the youngeſt one peny and three apples. The Steward bringing the fruit to his Lady, ſhe liked it ſo well, that ſhe ſent him for the reſt; who replied that there were but few remaining: ſhe notwithſtanding ſent him for them, and bid him bring them at any rate. The Steward coming to the Market again, could not buy the odde apples under a peny a piece (who to content his Lady, was fain to give it) then had the youngeſt Siſter three peniworths, the middle Siſter two peniworths, and the eldeſt one peniworth, and ſo had they all four pence a piece, and yet ſold as many for a peny one as another, aud neither changed apples nor monies one with another, as they were commanded.

Queſt. IV.

Quest. IV.

Of one that bought and sold both at a rate, and yet in the end proved a looser.

A man bought 100 of egges at three a peny, having 120 to the hundred, also he bought a hundred more at two a peny having likewise 120 to his hundred, these egges being mingled, he sold them away for 5 two-pence, and 120 to the hundred as he bought them, the question is, whether he gained or lost in that bargain.

If you work by the Rule of Three Direct, you shall finde that his 120 egges at 3 for a peny came to three shillings four-pence, and his 120 at 2 for a peny came to 5 shillings, which being addedmake 8 shillings 4 pence. Then again to see what they come to at 5 for 2 pence; work likewise by the rule of Three Direct, and you shall finde that 240 at 5 for 2 pence, comes but to 8 shillings, whereby the seller looseth 4 pence of the money they cost him.

Experi-

Experiments in Geometry

I.

How to take the Altitude of a Building, or other approachable height, by a line and plummet the Sun shining.

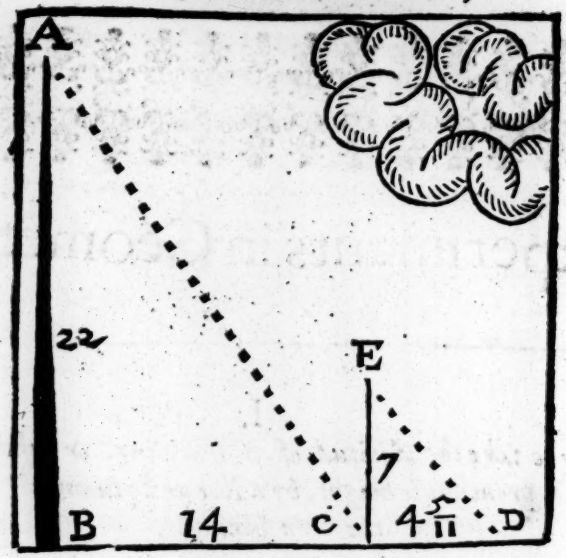
LEt the Building whose Altitude you desire to Know be A B, representing a *May*-pole, casting his shadow in a right line on the ground to C, at C let fall a line and plumet(whose length before you know in feet or inches) observing where the end of that shadow lights; which suppose at D, then measure the length of the shadow of the string, and consequently the shadow of the building, both which being exactly taken, work thus by the Rule of Proportion.

If C D, the shadow of the line and plummet 4 foot, and ; ; give E C, 7 foot in altitude.

What altitude doth 14 feet give, which is the length of the shadow of the *May*-pole.

Multiply and divide according to that Rule, and you shall find in your quotient 22 foot, which is the true altitude of the building required.

II. *How*

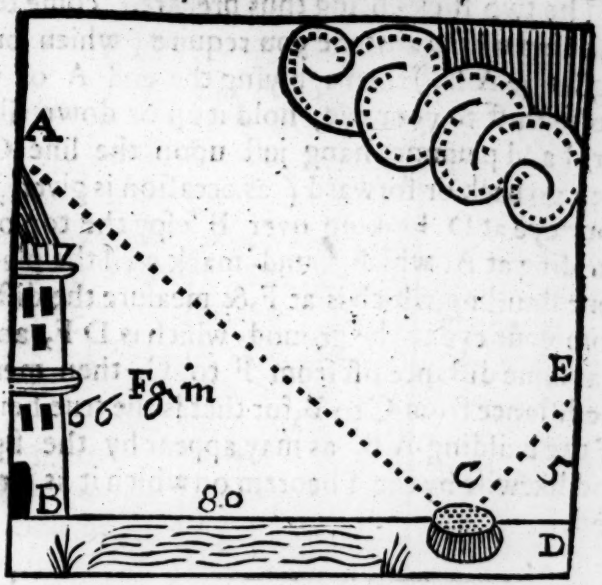


II.

How to take the Altitude by a Bole of water.

Place on the ground a Bole of water, which done, erect your body ſtrait up and go back (in a right line) from the building till you eſpy in the Center or middle of the water the very top of the Altitude; which done, obſerve the place of your ſtanding, and meaſure the height of your eye from the ground, together with the diſtance from your ſtanding to the water, and the diſtance of the water to the Baſe or foot of the Altitude; which being all exactly taken, will help you to the Altitude required, by the rule of proportion. Example,

Let the Altitude required be A B, the Bole of water placed on the ground at C, then go backward from C (your body erected as ſtrait as may be) till your



your eye at E spy the top of the Altitude A B in the water, which found observe the place of your standing at D, and measure the altitude of your eye to the ground, which is 5 foot, then measure the distance from D to C, which is 6 foot, and likewise the distance from C to B which is 80 foot, these 3 distances had, work by the rule of porportion Thus *As the distance C D is to the Altitude E D, So is the distance C B to the Altitude A B: Which is 66 foot and 8 inches.*

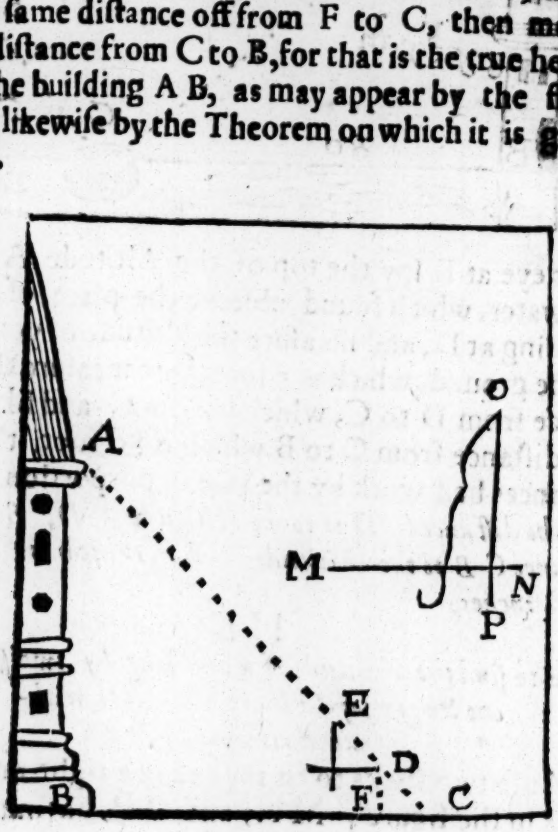
III.

How to find the Altitude of a building by two sticks of one length joyn'd in a right angle, without Arithmetick.

CAuse two sticks to be joyned in a right-angle, as is in the figure, M N, and O P, having at O a hole made wherein to hang a thrid and plummet.

The

The two ſticks being thus prepared, come to the building whoſe altitude you require (which building let be A B,) then applying the end A of your croſſe ſtaff to your eye, hold it up or down till the thrid and plummet hang juſt upon the line C D, then go back or forward (as occaſion is given) till your eye at D looking over E eſpy the top of the building at A, which found, mark well the place of your ſtanding, which is at F, & meaſure the diſtance from your eye to the ground, which is D F, and ſet that ſame diſtance off from F to C, then meaſure the diſtance from C to B, for that is the true heighth of the building A B, as may appear by the figure, and likewiſe by the Theorem on which it is grounded.

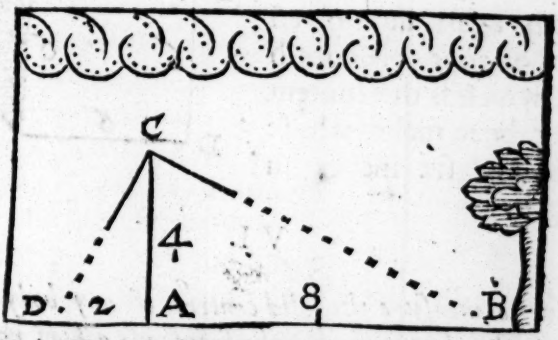


VI. *How*

How to find a distance by the two Sticks joyned square.

THis Experiment is grounded upon the 4 *Prop.* of the 6 of *Euclid.*

Let the distance which you desire to know, be A B, set up a staffe at A of 4 foot long, (or more or lesse, at your pleasure,) at A C at the end of the staffe C place a thrid C D then hanging the angle of the square O on the top of the staffe at C, lift it up or down, till you see the farthest part of your Longitude, the square so remaining, and the staffe not removed, draw the string that is fastened at C; close by the side of the square, till it touch the ground at D, then measure how many times the distance D A is contained in the staffe, for so many times is the staffe contained in the Longitude.



Example, The staffe supposed 4 foot high placed at A, and the square being hung thereon at C, the one end thereof pointing at B, & the other to D, then

measure the distance D A and you finde it to be two foot, then say, if C A contain D A two times A B shall contain C A as many, that is 8 foot, as may appear by the figure.

V.

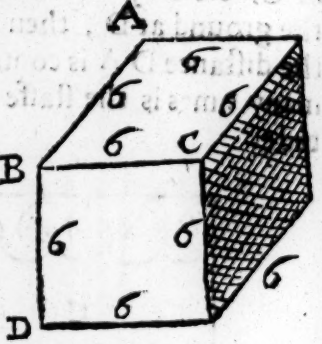
How to measure the solidity of a Cube.

THe Cube is a body composed of 6 square superficies of equal proportion, and is measured in manner following.

If you multiply any one side in it selfe cubially, it produceth the said Cube.

Example.

Let the Cube A B C D be given to be measured, the sides whereof are six inches in length: the square whereof is 36 which again multiplyed by the root produceth 216 which is the content of a cube in inches whose sides are six inches in length.



VI.

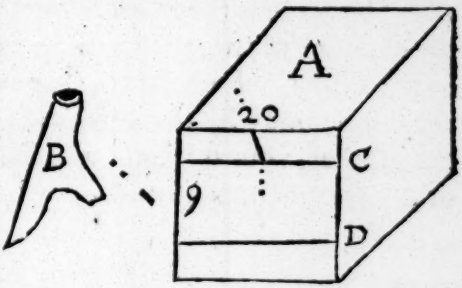
How to measure the solid content of any body how irregular soever it be, the form or fashion not regarded.

TO performe this you must prepare an hollow Cube, into which put your irregular body, which

which being placed therein you ſhall poure in ſo much water till it no more then cover the body in the Cube, then make a marke in the inſide of the Cube where the ſuperficies of the water toucheth. This done take out the irregular body, and marke again directly under the former, where the brim of the water now toucheth, for the diſtance of theſe 2 markes, multiplyed by the ſquare of the Cubes ſide, produceth the craſitude of that irregular body.

Example.

Suppoſe A to be the cubical hollow veſſel, whoſe inward ſide ſupppoſe to be twenty inches: B the irregularly body whoſe craſitude I deſire. Firſt, therefore I put B into the hollow cube A, and pouring in water till it be throughly covered, admit the brim of the water reach unto C then taking out that irregular body again, admit the ſuperficies of the water fall to D, then meaſure the diſtance between C and D, which ſuppoſe it 9 inches, which multiplyed in 400 the ſquare of the Cubes ſide produceth 3600, and ſo many cubical inches are contained in the irregular body B.

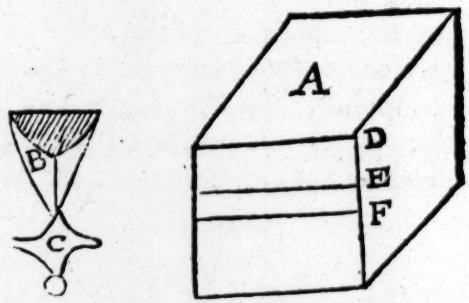


VII.

How the weight of any part or portion of a ſolid body may be known, without ſeparation thereof from the other part of the body.

HAving a Cube prepared as before declared, firſt, put the ſolid body thereinto, which done fill the Cube top full of water, then ſoftly lift that body out of the water, till ſuch time as there remain no more in the water, then that portion, whoſe weight you deſire to know, at that inſtant make a mark on one ſide of the veſſel where the ſuperficies of the water then toucheth, then take out the body all together, this done meaſure the diſtance from the former marke to the ſuperficies of the water as it is now after the body is taken quite out. Likewiſe meaſure the diſtance of the waters ſuperficies from the top of the Cube, which done, ~~augment~~ Multiply the weight of the whole body by the leſſer diſtance, and divide by the greater, your quotient will ſhew the true weight of the fragment required.

Example.



Admit B C to be in all 100 pound weight being either Braſs, Iron, Silver, lead, ſtone, or other mettal my dſire is to know the weight of the portion C, firſt, therefore putting the whole body

body into the veſſel A, I fill it full of water, then lifting it ſoftly up till all the body be out of the water excepting C, I finde the ſuperficies of the water to be fallen to E, where I make a marke, then take out the whole body, admit the water is fallen to F, and that by meaſuring I finde E F to be 8 inches, and D F 20 inches, 8 multiplyed in 100 (the whole pillars weight) yieldeth 800, which divided by 20 (the greater diſtance) bringeth in the quotient 40, ſo many pound weight I conclude the portion C to weigh.

VIII.

How Archimedes *found what quantity of gold was taken out of the King of the* Siracuſans *Crowne, and how much ſilver put in the roome thereof without breaking of the Crown.*

Hiero King of the *Syracuſans* in Sicilia had cauſed to be made a Crowne of gold of a wonderful weight to be offered for his good ſucceſſe in the wars, in making whereof the Gold-ſmith fraudelouſly, tooke out a certain portion of gold, and put in ſilver for it, ſo that there was nothing abated of the full weight, although much of the value diminiſhed, Which thing at length being uttered the King was ſorely moved, and being deſirous to try the truth, without breaking of the Crowne, propoſed the doubt to *Archimedes*, unto whoſe wit nothing ſeemed impoſſible, which although he could not preſently anſwer, yet he had good hopes to deviſe ſome policy for that invention, and ſo muſing thereon, as he chanced to enter into a bane full of

water

water to waſh him, he obſerved that as his body entred into the bane, the water did runne over, whereby his ready wit of ſuch ſmall effects, conjecturing greater workes, conceived by and by a reaſon of ſolution of the Kings queſtion, and therefore rejoycing exceedingly (more then if he had gotten the Crowne it ſelfe) forgot that he was naked, and ſo ran home, crying as he ran *inveni, inveni*, I have found, I have found, and thereupon cauſed two maſſie pieces, one of gold and another of ſilver to be prepared of the ſame weight that the Crowne was of, and conſidering that gold is heavier of nature then ſilver, and therefore gold of like weight with ſilver, muſt needs occupy leſſe roome by reaſon of its more compact and ſound in ſubſtance, he was aſſured that putting the maſſe of gold into a veſſel brim full of water, there would not ſo much water run out, as when he ſhould put in the ſilver maſſe of like weight. Wherefore he tryed both, and noted not onely the quantities of the water of each time, but alſo the difference or exceſſe of the one above the other, whereby he learn what proportion in quantity is between gold and ſilver of equal weight and then putting the Crowne it ſelfe into the water brim full (as before) marked how much water did run out then, and comparing it with the water that run out when the gold was put in, noted how much it did exceed that, and likewiſe comparing it with the water that run out when the ſilver was put in, marked how much it was leſſe then that, and by thoſe proportions found the juſt quantity of gold that was taken out of the Crowne, and how much ſilver was put in inſtead of it; by the which ever-

ever ſince the proportions of mettals one to another, are tryed and found.

IX.

How a man may diſcend into the bottom of any Water or River, his body remaining dry.

THis Experiment was ſhewed at *Toledo*, by two *Greeks*, who taking a Caldron of great capacity, the mouth turned downward, and ſo hanging it in the aire by ropes, they faſten certain ſhelves in the middeſt of the Caldron, where they place themſelves and a fire. Then to make it hang at *æqua libra*, they compaſſe the Circumference thereof with leaden plummets on every ſide equally, and made of equal weight, leaſt any part of the Circumference of the mouth of the Caldron when it is equally and ſoftly let down into the water, ſhould ſooner touch the water then the whole Circumference, ſo ſhould the water eaſily overcome the aire incloſed in the Caldron, and reſolve it into moiſture. But if by due proportion (the Caldron thus prepared) be ſoftly ſet down into the water, the aire incloſed in the Caldron (by reſiſtance of the water) ſhall violently make himſelf place, not admitting the water to enter. So the men there incloſed, ſhall ſo long remain dry in the middeſt of the water, until ſucceſſe of time doe by reſpiration weaken and conſume the incloſed aire. But if in due time the Caldron be ſoftly and equally drawn out of the water, the

men ſhall remaine dry, and the fire not extinct.

This Experiment may thus be proved.

Take a Cup of Glaſſe of a certain quantity, the Circumference of the mouth whereof ſhall be broader then the Circumference of the bottom, in the mouth whereof let be faſtened a little ſtick, tying thereto a thread and plummet. On the ſtick faſten a little candle of wax, whoſe light may come onely to the middeſt of the Cup, leaſt too much neerneſſe of the water might ſuffocate the candle; Then proportionally (as in the former Experiment) put the cup with the burning candle into a veſſel full of water, and in due time, draw it out ſoftly and equally, ſo that no part of the mouth or Circumference thereof be drawn out before the whole, ſo ſhall the candle remaine burning as it was when it went in.

X.

What proportion ought to be uſed in the building of all Ships whatſoever.

THe due proportion of a Ship is that the Longitude of the Veſſel whatſoever it be, more or leſſe, ought to be divided into 300 equal parts, of the which parts 30 muſt be aſſigned to the depth, and the breadth ſhall contain 50, or the ſixth part of the longitude, ſo ſhall the Ship be both proportionable, and more ſafe for Traffique.

XI.

XI.

The Deſcription of a Ship that cannot be drowned.

THis Experiment was invented by one *Leonardo Fiorivanti* an Italian, who affirmeth that the like was never invented ſince the creation of the World: He deſcribeth the ſaid Ship on this manner, Take Beames of Firre or Pine Tree, which of their own nature can never goe down or ſink, or abide under the water, and with theſe beames frame an Engine of the length of 60 foot, and 111 of the breadth of 20 foot, and of the heighth of 6 foot, laying the firſt rank in length, and the other traverſe, and the third again in length, faſhioning the fore part like unto other Ships, and in like manner bring the hinder part to good forme, then with irons bind it and faſten it that it cannot break, and upon this frame or foundation build your Ship of ſuch faſhion as you think beſt, ſo ſhall it be able to carry any voyage, without fear of drowning.

XII.

How to order a Picture, that if you look on the one ſide ſhall repreſent one thing, and on the other ſide, an other thing, and juſt before in a confuſion.

LEt the two Pictures which you intend thus to order be both of one length and breadth, and pro-

provide a board of the ſame bigneſſe about an inch thick, which muſt be planed in an indented form, (as are thoſe boards which women uſe to pleat their Cuffes, but the indentings muſt be a great deal bigger,) which provided, cauſe the Pictures to be cut exactly in long Labels of the ſame breadth as the ſides of the indentings are, this done, with paſte or fine ſtarch, paſte thoſe Labels to the ſides of the indentings, one on the right hand, and the other on the left hand, ſo proceeding till you have done all the Labels of the Pictures, then hanging it up, if you ſtand on the right ſide of the Picture, you ſhall ſee that Picture which was paſted on the right ſide of the indentings, and if on the left ſide of the Picture, the other, and right before in a confuſion, which conceit hath cauſed no ſmall admiration to thoſe that know not the reaſon thereof.

XIII.

To break a Staffe upon two Glaſſes of water.

PLace the Glaſſes being full of water upon two joyn Stools, or ſuch like equidiſtant from the ground, and diſtant one from another, the length of the Staffe; Then place the ends of the Staffe upon the edges of the two Glaſſes, ſo that they be ſharp, this done, with all the force you can, with another Staffe ſtrike the Staffe which lies on the Glaſſes in the midſt, and it will break, without breaking the Glaſſes or ſpilling the water.

XIV.

XIV.

To make a Glaſſe of Water ſeem to boil.

TAke a Glaſſe neer full of water, and ſetting one hand upon the foot of it, hold it faſt, urn ſlightly one of your fingers of your other hand upon the brim or edge of the Glaſſe, having before privately wet your finger, and ſo paſſing ſoftly on with your finger in preſſing a little, the water will ſeem to boil and leap over the Glaſſe by drops.

XV.

How to know the hour of the Day by the hand and fingers.

TAke a Straw or the like, of the length of the Index, or the ſecond finger, hold this ſtraw very right between the thumb and the right finger, then ſtretch forth the hand, and turn your back and the palm of your hand towards the Sun, ſo that the ſhadow of the muſcle which is under the thumb touch the line of Life, which is between the middle of the two other great lines, which is ſeen in the palm of the hand; this done, the end of the ſhadow will ſhew what of the clock it is, for at the end of the great finger it is 7 in the morning, or 5 in the evening, at the end of the ring finger, it is 8 in the morning, or 4 in the evening, at the end

end of the little finger, or first joynt, it is 9 in the morning, or 3 in the afternoon, 10 and 2, at the second joynt, 11 and 1, at the third joynt, and mid-day in the line following, which comes from the end of the Index; Note, that this Experiment must be performed by the left hand.

XVI.

How to make two Images, one of which shall light a Candle, and the other blow it out.

UPon the side of a wall make the figure of two Images, in the mouth of each put a pipe or quill, so artificially that it be not perceived; in one of which place Salt-peter very fine, and dry, and pulverised, and at the end set a little match of paper, in the other quil Sulphur, beaten small; Then holding a lighted Candle in your hand, say to one of those Images by way of command, Blow out the Candle, then lighting the paper with the Candle, the Salt-peter wil blow out the Candle immediately, and going to the other Image, (before the snuff of the Candle be out,) touch the Sulpher with it, and say, Light the Candle, and it will immedia tely be lighted.

XVII. *How*

XVII.

How to disguise or disfigure an Image, as a head, an arm, a whole body, &c. So that it hath no proportion, the ears to be over long, the nose as that of a Swan, &c. yet the eye placed at a certain point, will be seen in a direct and exact proportion.

I Will not strive to set a Geometrical figure here, for fear it may seem too difficult to understand, but I will indeavour by discourse how mechanically you may with a Candle perceive it sensible; First, there must be made a figure upon paper, such as you please, according to its just proportion, and point it as a Picture, afterwards put a Candle upon the Table, and interpose this figure obliquely between the said Candle, and the Books of Paper, where you desire to have the figure disguised, in such sort that the heighth passe a thwart the hole of the Picture, then will it carry all the forme of the Picture upon the Paper, but with deformity; follow these tracts and marke out the light with a coles black head or inke, and you have your desire.

To finde now the point where the eye must see it in its natural forme, it is accustomed according to the order of Perspective to place this point in the line drawn in heighth equal to the largenesse of the narrowest side of the deformed square, and it is by this way that it is performed. XVIII.

XVIII.

How to make a Clock with one wheel.

MAke the body of an ordinary Dial, and divid the hour in the circle into 12 parts, make great wheel in heighth above the Axel-tree, to th which you ſhall place the Cord of your counter poiſe, ſo that it may deſcend, that in 12 hours of time your Index or Needle make one revoluti on, which may be known by a Watch, then pu a ballance, which may ſtop the courſe of th Wheel, and give it a regular motion, and you ſhall ſee an effect as juſt from this, as from a Clock with many Wheels.

XIX.

To find what is hidden in two hands.

SUppoſe that a man holds divers things in his hand, as Gold and Silver, and in the one hand he holdeth the Gold, & in the other the Silver, now to know which hand the Gold is in, & which the Silver, appoint for the Gold 4 ſhillings, & for the Silver, 3 ſhillings, or any other prizes, ſo one be odde, and the other even, then bid him triple that which is in the right hand, & double that which is in the left hand, then bid him adde theſe two products together, and ask him if it be even, or odde; if it be even, then the Gold is in the right hand, if odde, the Gold is in the left hand.

XX.

XX.

To make a Cone to move by the edge of a Table.

MAke therefore a Cone of Paper, and ſet it on the Table cunningly conveying under it a Beetle, or ſuch like creeping thing, and you ſhall ſee the thing move on the Table, as if the paper were a living creature.

FINIS.

BRITISH MUSEUM
MAR